AVIATION

The Oldest American Aeronautical Magazine

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Army bombers over the crater of the Tnal volcano in Hawaii

VOLUME XXIV

NUMBER 18

Special Features

The Halpin "Flamingo"
A Designer's Impressions of the Detroit Show
The All-American Aircraft Show in Retrospect

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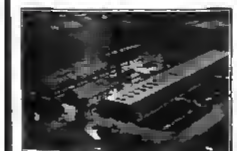

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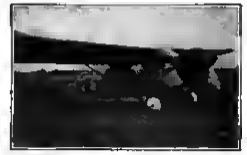

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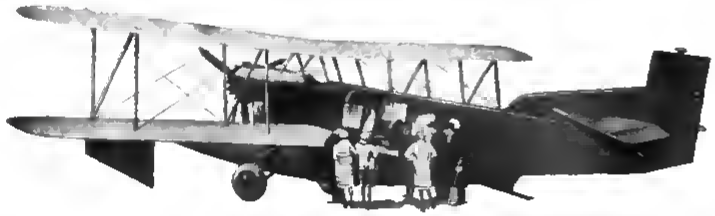

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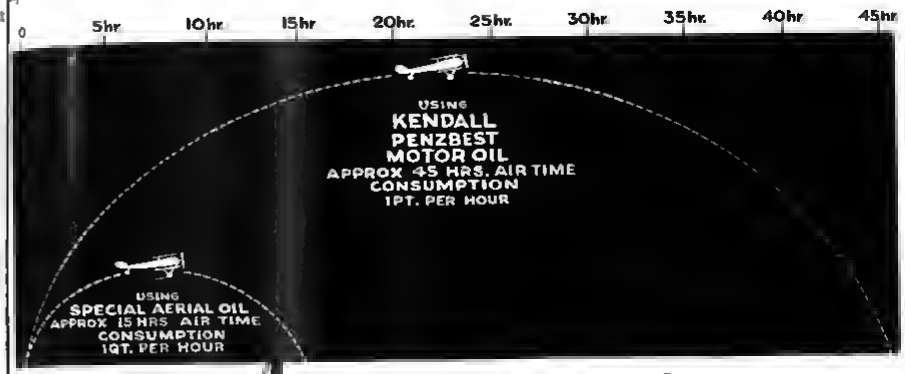

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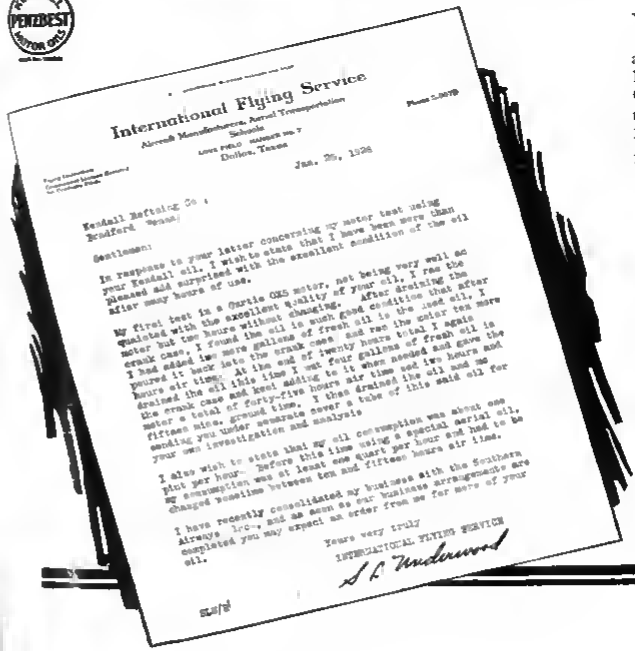

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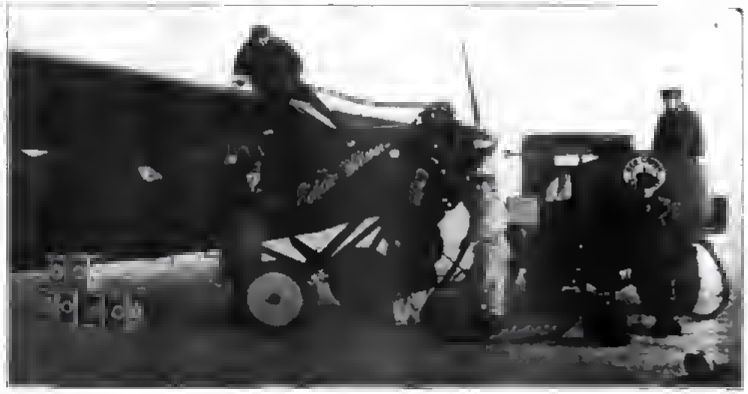

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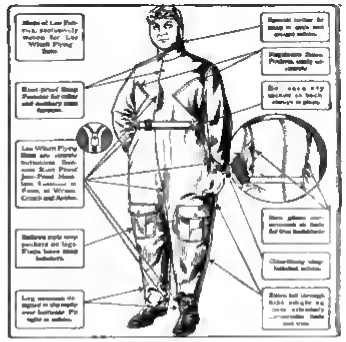

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The Oldest American Aeronautical Magazine

Vol. XXIV APRIL 30, 1928 No. 18

Counting the Cost

THE GREAT success of the aeronautical show at Detroit will undoubtedly make a large number of cities want to stage similar affairs. Chambers of commerce, boards of trade and professional organizers of exhibitions will undoubtedly see a new and profitable outlet for their energies. Many of these organizations will have the highest motives in the world and a real desire to promote aeronautics as well as to boost themselves, and they will not be able to understand why the aeronautic industry does not wish to back a show in every large town in the country. The truth is however, that as far as the industry is concerned even the Detroit show did not carry itself. One company estimated that the show expenses including the cost of putting up its exhibit, the salaries and expenses of salesmen and executives, the special literature and advertising cost around $5,000. Other exhibitors may not have spent as much but if the expenses of the accessory people are included the total cost to the industry must have run into hundreds of thousands of dollars.

If shows of the magnitude of that put on at Detroit were put on in very many cities the cost to the industry would be disproportionate to the volume of aeronautical sales which have so far been reached. There are undoubtedly other forms of sales outlets which would produce more direct results for the same or less cost. The expense to the industry could be cut down by reducing the number of exhibits but this would not create the impression of a large show. In fact a small list of exhibitors in a large city might do more harm than good. A few good shows each year are of great value to the industry in the forming of dealer and distributor contacts, but if there were a large number of shows this advantage would not be continued.

Flying Clubs

THE QUESTION has been asked as to why England has so many successful flying clubs while we have lagged behind in this development. The answer lies partly in the fact that the English Clubs are subsidized, and partly in the fact that in this country almost every town with a flying field has a commercial flying service, which among other things gives instruction at rates which are nearly as low as those which could be charged by a flying club not subsidized or endowed. To a large extent our flying schools, and the instruction which will be given by manufacturers in their attempts to increase the sales of their planes, fill the requirements for primary training. The club which is based on the idea of giving primary training has to meet the competition of the commercial schools which are more efficiently managed than most clubs.

It would seem logical to have the flying clubs organized along lines that would supplement and not compete with the existing flying schools. If they are to be successful they should fill a need and supply a service which is not supplied by the commercial schools. There should be room for a club whose members have soloed but who wish to get in enough flying time to obtain their professional pilot's license at the lowest possible cost, and, while they are working at other trades.

Another idea which would supplement rather than compete with the existing flying schools is that of a club run along social lines. The members of such a club would not be expecting to earn their living out of professional piloting but would be flying for fun or, incidentally, to their businesses. It should have a good club house with a restaurant and possibly a tennis court or swimming pool. Membership would be rather exclusive and if properly sponsored non-flying members would join for the social opportunities offered and this would help form an endowment which would lessen the cost of flying. At the present time there may not be enough private fliers to organize such a club except in the larger cities but the idea is basically sound, whereas the formation of a club which is merely a flying school disguised under another name is not sound and is really unfair to the local commercial schools.

Fuelless Engines

THERE HAVE been so many claims for super engines that those who really have a background of good technical experience have grown very skeptical about the possibilities of radical developments. To the layman the fact that our present power plants only deliver about twenty per cent of the energy in the fuel makes them believe that there is still room for improvement. The layman feels that an engine which uses only one stroke out of four for the power impulse can be improved. If recent German claims of the building of a jet propulsion motor are true, a revolutionary development in high speed flying is forecast. Wireless power and atomic energy are attractive fields to speculate on while the gas turbine is the happy hunting ground of every amateur inventor. Some day the revolutionary discovery may be made but in the meantime the stock of the Wright company still sells at a good figure on the stock exchange.

The All-American Aircraft Show *in* Retrospect

By R. SIDNEY BOWEN, JR.

IF IT is possible to select any one great outstanding feature of the All-American Aircraft Show held this month in Convention Hall, Detroit, Mich., it is the fact that the array of airplane, engine and accessory exhibits surpassed in attractiveness and interest the predictions of even the most optimistic. Never before in the history of aeronautics has there been housed together under one roof such a collection of aircraft, military or commercial, as there was in Convention Hall. In previous aircraft shows military planes were in the majority but at the Detroit Show, of the 58 planes exhibited only one was a military plane. In every respect it was a display of American progress in commercial aeronautics and it demonstrated to its backers, and the industry at large, that not only can an aircraft show have as great a pulling power as an automobile show but that in the very near future it will serve as great a sales outlet for the aeronautic industry as automobile shows serve as sales outlets for the automotive industry.

The Wright Aeronautical Corp. exhibit. The center engine is the cut away model of the Wright Whirlwind J-5

Although official figures are unavailable at this time it is believed that quite a few plane sales were made during the show, to say nothing of the engine and accessory sales. A good portion of the plane sales were made to persons not connected with the industry which more or less proves that not all of the 150,000 persons, that are estimated to have visited the show, were simply interested spectators. It is undoubtedly true that the show met the airplane manufacturers, in particular, far more than they took in by actual sales, but that to a large degree was compensated for by the exceptional opportunity offered to inspect competitors' products, make new acquaintances in the industry, line up distributors and dealers, and last but not least contact prospects that will result in plane sales in the near future.

By actual count the plane exhibits consisted of 58 planes one of which was a Vought "Corsair", the only military plane exhibited, 24 monoplanes, three of which were historic (the Ford trimotor "Josephine Ford", the Stinson "Pride of Detroit" and a 1909 Bleriot); six seaplanes, including one Stinson monoplane fitted with pontoons, three amphibians, one flying boat, three stripped fuselages, two stripped wings, and one whole plane completely stripped.

Outside of the refinements in design, power plant installation, etc., the various planes exhibited were featured by attractive color combinations and nickel fittings. At first glance upon entering the Hall one was greeted with a kaleidoscopic picture of brilliantly colored wings and fuselages that stood out in bold contrast to the more sombre decorations that adorned the walls and ceiling of the various sections. As a means of improving the looks of future shows, it might be worthwhile to mention at this point that one part of Convention Hall was artistically decorated with white, purple and black trimming. This combination is really more appropriate at a mourning function than at an aeronautic display.

Although the planes were well arranged and each exhibit was attended by at least one member of the firm at all times, the lack of printed information was quite noticeable. Reference is not made to printed information such as handouts, etc., for in reality there was an abundance of such material, but rather to the lack of posters and cards hung on the planes giving data on the type of place it was, its seating capacity, its uses, the type of engine installed, its performance, etc. True, some of the exhibits did include such information but the majority merely had the name of the company, the name of the plane and its price, F.O.B. factory.

Perhaps in the future when the various planes become as well known to the public as the automobiles are now, a limited amount of card and poster data will suffice, but at present, in view of the fact that the industry is striving to educate the public in aeronautics, it might prove much more beneficial to be as complete as possible in this respect.

Two general views of the Show. On the left can be seen a Driggs Dart, a Laird seaplane and land plane and a Wallace "Fenroplane". On the right is the Advance Aircraft Co. exhibit with the Alexander Aircraft Co. display in the background.

The picture on the left shows the unique exhibit of the Scintilla Magneto Co. To the right is the Stinson "Junior" powered with a 110 hp. Warner engine. This plane was bought by the Union Trust Co., Detroit, Mich.

Information Readily Supplied

One thing that is particularly worthy of comment in regard to all of the exhibits is the manner in which everyone connected with a display took the time and pains to give an intelligent and informative answer to all questions that were asked by visiting laymen. Ridiculous as some of the questions were they at least indicated an interest in aeronautics by non flying men, women and children. The exhibitors appreciated that fact and realized that each inquirer was a potential prospect, if not at present then at sometime in the future, and therefore deserved sincere attention. In short, every exhibitor did all he possibly could to make every unattended person enminded before he or she left the Show.

As far as could be noted no one particular plane received more favorable comment or attention than another. The visitors' likes and dislikes seemed to average more or less. However, there was one important point, regarding the displaying of airplanes, that proved its value at Detroit from the standpoint of attracting attention. This was the matter of exhibiting uncovered fuselages and wings. Only six of the forty odd airplane exhibits included this item and the attention they received from the Show visitors was of such extent that it would seem highly advisable for exhibitors in future aircraft shows to be sure to display either an uncovered wing or an uncovered fuselage, preferably both.

It is admitted that such an exhibit entails the additional cost of freight transportation, etc., whereas a plane can be flown direct to the city or town in which the show is being held. Nevertheless such additional costs are really warranted. Prospective dealers, in particular, like to inspect the structural design and workmanship of the product they contemplate selling. According to one exhibitor at the Detroit Show the presence of an uncovered fuselage in his exhibit was of great assistance in the matter of signing up several dealers.

Then too, the public is extremely interested in viewing first hand structural details of an airplane, the manner in which the controls are operated, and the way the engine is installed, etc. All of these points are more or less concealed in the completed plane. Therefore, if an exhibitor arranges it so that prospective customers can see them, he not only adds to the interest of his display but helps himself and his representatives in the matter of making sales.

Attractive Layouts in Operation

What the engine and accessory exhibits lacked in the way of color schemes they made up for in attractive layouts in actual operation. In fact it might be stated that more time was spent by visitors in the examination of the exhibits included in these two divisions than in the airplane division. It is impossible to estimate the sales made but it is quite probable that they totaled an amount of several thousands of dollars. Because of the design of Convention Hall it was undoubtedly found impracticable to group the engine exhibits in one section and the accessory exhibits in another. As a result about two thirds of the exhibits in both divisions were grouped to-

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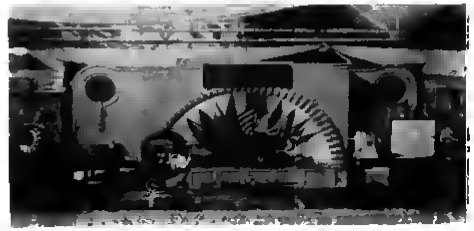


Part of the exhibit of the American Eagle Aircraft Corp. Note the uncovered fuselage displayed. The picture to the right shows the exhibit of SKF Industries, Inc.

A Designer's Impressions *of the* Detroit Show

By B. V. KORVIN-KROUKOVSKY

THE ALL-AMERICAN Aircraft Show held this month in Detroit, Mich., was the first aircraft exhibition since 1920, when a similar show was held in New York. To those remembering the 1920 Show, the comparison of the two gives very instructive ideas of the development which has taken place during these eight years, and also of the process of development continuing at present. Technical development is a slow process requiring much time and money. It is, however, a perfectly definite process, and, if the aim is clearly stated, the results will inevitably follow. Plenty

An Alexander Eaglerock powered with an OX-5 engine on display at the Detroit Show

of capable scientists, engineers and workmen can be found; new processes and new methods of work can be devised; and even new materials can be discovered and also created, as strong aluminum alloys, and bakelite have been created. Everything is possible, provided the aim is clearly stated. The engineer's biggest problem is not to find the means of attainment, but to define clearly the aim to be attained. The history of engineering is full of examples of great wastes of effort, time and money for something that was not wanted.

The National Aircraft Shows are particularly valuable to aeronautical engineers in that they collect in one room so many machines built in different parts of the country and to different ideas. Simultaneous examinations of so many materialized ideas makes it much easier for him to formulate in his mind the tendencies of development. Comparison of the shows of the past with the Show of the present point out to him the mistakes in foresight made before, and helps to avoid making such mistakes in future.

The New York Show of 1920 was composed of the achievements of military aeronautics at the end of the war on one hand, and of the courageous but inexperienced attempt of the aeronautical industry to enter commercial field on the other.

There was no experience in commercial application of aeronautics and there hardly was any demand for commercial airplanes. What was exhibited represented merely the theoretical ideas of the men at the helm of the aeronautical industry. Some of these ideas were unpractical, some were good but premature, and very few indeed found any practical application.

The All-American Aircraft Show in Detroit, on another hand, demonstrated results of eight years of development of commercial aeronautics. At least one-half of the 52 airplanes exhibited there had previously proved their value in practical service. The remaining one-half represented speculative ideas regarding future requirements. Both are interesting as aeronautical engineers—one recording the past achievement, another pointing the way to future development.

Among the machines of proved practical value the first attention is justly claimed by three seater general purpose airplanes weighing between 2,000 and 2,600 lb., when fully loaded. There was little theory in the process of development of these airplanes. They were originally developed from the old Jenny under pressure of the demand for something better, and for a long time were limited to the use of OX-5 engines. Practice proved that the 3 seater airplane is the most convenient type for many commercial applications. Demand for such carrying capacity with the OX-5 engine led to the production of airplanes of very light weight and of excellent aerodynamic efficiency. Healthy competition fixed the low selling price. Subsequently, the demand for greater performance resulted in the installation of Wright Whirlwind engines, and still later the requirements of the Department of Commerce led to considerable increase of strength of these machines, which was accomplished by better design without adding an appreciable amount of weight. In the present state of development they represent a wonderful combination of

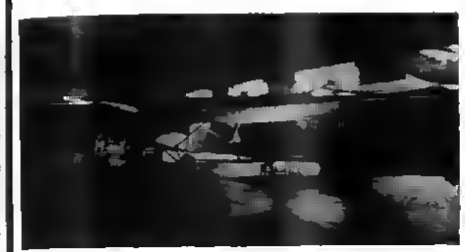
An International F-17 powered with an OX-5 and an F-11 cabin plane powered with a Wright Whirlwind.

aerodynamic refinement, light weight, structural strength and low price. At the Show this class was represented by Waco 10, Eaglerock, Swallow, Travel Air, Lincoln Page, E. M. Laird, Challenger, American Eagle and International airplanes.

Developed for the same requirements, in direct competition and under influence of one upon another, the members of this class are very similar in general conception, materials and details of construction. All are single bay biplanes with

wire bracing and wood and fabric wings; all have ailerons on all four panels; all have two open cockpits, rear one seating a pilot and front one two passengers, and all have the split type landing gear. Seven out of nine types have welded steel tube fuselage and tail surfaces and all but one have a quickly adjustable stabilizer.

We know for a fact that these machines are low priced. Yet there is nothing in their design and appearance that suggests what theoretical designers call cheap. The fuselages are of good streamline form and vary in width through-



The Hamilton "Silver Streak", an all-metal monoplane powered with a Pratt & Whitney "Wasp" engine.

out their length. The upper and lower wing panels are not interchangeable, the wing tips are nicely rounded and faired. At the roots wing panels fit snugly to the center section or to the fuselage, and there is no gap for hinges often found in military machines of several times their price. The tail surfaces have a variety of shapes pleasing the eye, and no attempt is made to make rudder interchangeable with ailerons or elevators. Were we not so accustomed to see the machines of this class quite often, and to think of them as cheap, we would find probably that they are rather complicated. One is inclined to believe that a monoplane with only two panels instead of four, and with half the number of fittings could be made much cheaper. As a matter of fact, it appears that cost of construction depends more on how conventional it is, than on how simple (theoretically) it is. A perfectly conventional design and concentration of attention on shop practice rather than on engineering seem to be responsible for the amazingly low price of these machines.

Do not Satisfy Popular Demand

Up to recent times the machines of the 3 seater 2000-2600 lb. class were used with the OX-5 engine. The desire of better performance and the lack of engines of somewhat greater power led to the installation of Wright Whirlwind of 2½ times power of the OX-5. This produced very powerful and necessarily expensive airplanes which have, however, somewhat exclusive application and do not satisfy popular demand for low priced airplanes. The supply of OX-5 engines appears to have shrunk before any other engine of suitable power attained wide recognition, thus putting manufacturers of the class of airplanes in rather an embarrassing position. They responded to this lack of certainty by providing for installation of any engine the customer may want. The machines at the Show were exhibited with OX-5, Fairchild, Siemens and Whirlwind engines. The Advance Aircraft Co.'s exhibit, for instance, featured all four of these installations. Such a state of affairs is obviously incompatible with quantity production, and complicates a good deal the production and the distribution of the machines to dealers and the public. It shows only the state of uncertainty of waiting for some of these engines to prove themselves or for some other engine to appear. There is little doubt that as soon as some of the air-cooled engines of moderate power (120 to 140 hp) win wide recognition, that the manufacturers will make their selection and will standardize on one or another.

Another well-defined and well-proved class of commercial airplanes is formed by the Whirlwind engined five or six seater cabin airplane weighing fully loaded from 3500 to 3900 lb. While the airplanes of this class came into existence spontaneously some four years ago, without a long chain of development, they immediately were found to be in considerable demand. One of the reasons for this was the very high speed of these machines for the power of the engines and for the load they carried. When four years ago the Wright-Bellanca Monoplane won the speed race in New York competing with Navy airplanes, the aeronautical world was startled. Since then it has been startled time after time. Next the Bellanca machine broke the endurance record, then Lindbergh in a Ryan Monoplane crossed the continent and the ocean, then again the Bellanca flew to Germany, establishing a distance record. Then there came the wonderful trip of Brock and Schlee across the Atlantic, Europe and Asia in a Stinson Monoplane, and recently the endurance record was broken again in a Stinson Monoplane. Indeed the airplanes of this type have something to show.

The Wright engined cabin airplanes fall in two distinct groups—monoplanes and biplanes. It is fair to mention that all the laurels were won by the monoplanes. At the All-American Aircraft Show the monoplanes were represented by Bellanca, Fairchild, Ryan Brougham and Stinson, while the biplanes were represented by Buhl Airsedan and International Air Coach. All the monoplanes are characterized by wings of uniform section and thickness hinged at the top of the fuselage, and externally braced by struts attached at the bottom of the fuselage. In all the monoplanes and in the Buhl biplane the fuselage is of welded steel tube construction and of sufficiently large size to allow the arrangement of a spacious cabin. In all of the four monoplanes at the Show the

The Ireland "Neptune", one of the two amphibians at the Show. It is powered with a Wright Whirlwind.

pilot's seat is in the same cabin and in front of the passengers. The spaciousness and the comfort of the cabins in the airplanes of only 200 hp. is quite surprising. The upholstery and the finish in these cabins suggest that aeronautical engineers of today must be quite versed in automobile body design. No attempt is made to provide the silencers, but the use of exhaust manifold, directing the exhaust under the cabin is quite universal. This feature, combined with sound deadening upholstery of the cabin, probably reduces the noise until it is no longer bothersome for passengers. The control cables follow along upper corners of the cabin or under the floor and are not noticeable at all. The use of adjustable stabilizer is quite universal.

The gasoline tanks are located in the wings and are hardly noticeable, as the naturally thick wings of the monoplanes allow plenty of room for their installation

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Wing Stress Analysis

Stress Analysis of Commercial Aircraft, Chapter Number Eight

By PROFESSOR ALEXANDER KLEMIN
Daniel Guggenheim School of Aeronautics

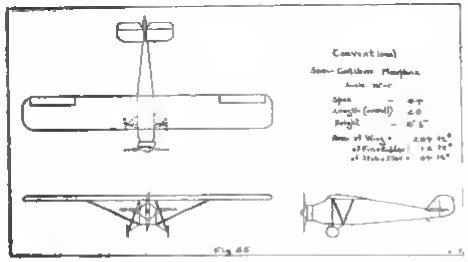
And GEORGE F. TITTERTON
Late of the Bureau of Aeronautics, Navy Department

A CONVENTIONAL semi-cantilever monoplane will be designed and analyzed to indicate the application of stress analysis rules in an actual case. In this Chapter the wings only will be analyzed.

The plane is a three-place, semi-cantilever, cabin monoplane, equipped with an air-cooled radial engine rated at 130 hp. A three view drawing of the plane is given in Fig. 55.

Detail of Wings

The wing beams and compression struts are of spruce with round tie-rods in the drag truss. The supporting or lift struts are of round steel tubing streamlined with spruce. They are pinned at both ends. It may be seen in Fig. 55 that these struts join at the lower longeron at a point midway between



the spars. For the first drag bay outboard of the fuselage the ribs are spaced 12 inches apart and thereafter 15 inches apart. All drag bays are of the same dimensions, namely 60 inches by 42 inches. The wing spars are pinned horizontally at the fuselage. The wing loads are carried through the fuselage by steel tubing in place of the spruce beams. A 50 gal. gas tank is hidden in the contour of the wing directly over the fuselage.

The wings will be analyzed for the high incidence condition only. The analysis of the low incidence and inverted flight conditions is very similar. All tables of data and calculations will be made up for a complete analysis and it will be indicated in each case how the low incidence and inverted flight values are obtained. Whenever the analysis of these conditions varies from that of high incidence, they will be treated in detail. It would be advisable to fill in the blanks in the tables for low incidence and inverted flight for practice in making the computations.

General Data.

Airfoil Section—Clark Y
Gross Weight of Airplane (fully loaded)—2210 lb
Weight of Wings (1.23 lb./sq. ft.)—365 lb
Net Weight of Plane—1855 lb
Total Span—44 ft.
  Length of Center Section—3 ft. (fuselage, no wing.)
  Length of bay—10 ft.—120 inches
  Length of overhang—10.5 ft.—126 inches.
Chord—7 ft.—84 inches.
Incidence—0°
Dihedral—0°
Area of Wing (including ailerons)—284 sq. ft.
Location of wing spars in per cent. of chord from leading edge. Front spar—15% Rear spar—65%
Center of Pressure in per cent. of chord:
  H.I.—31% L.I.—51% I.F.—31%
Load Factors required:
  H.I.—6.9 L.I.—4.5 I.F.—2.76
Ratio of chord to beam components
  H.I. = —0.144 L.I. = 0.15

Explanation of General Data.

The gross weight of the plane is made up of the following items:

Propeller	55 lb.	(metal propeller.)
Engine	360	(approx. wt. of 130 hp. engine)
Oil and Tank	45	(5 gal. × 7.5 lb. = 37.5 lb. and 7.5 lb. tank.)
Power Plant Equip.	50	(instruments, piping, etc.)
Pilot	165	
Chassis	130	(wheels, struts, shock absorber)
Gas and Tanks	330	(50 gal. × 6 lb. = 300 lb. and 30 lb. tank.)
Wings	365	(284 sq. ft. × 1.25 lb.)
Fuselage	220	(steel structure, seats, fairing, etc.)
Passengers	330	
Baggage	100	(if ship is overweight, baggage is reduced)
Tail skid	10	
Tail surfaces	50	(about 1 lb. per sq. ft. of area)
Total	2210 lb.	= Gross Weight.

The area of the wing is the total span minus 3 feet allowance for the fuselage, multiplied by the chord, and then reduced 3 sq. ft. because of the curved tips. That is (44 — 3) × 7 — 3 = 284 sq. ft.

The center of pressure for the Clark Y is obtained from Table 15 of Chapter 7 of this series.

Load factors required: The power loading is 2210/130 = 17 lb./hp. Referring to Fig. 1 of Chapter 3 the required high incidence factor is 6.88 say 6.9. Low incidence = 8.9 × .55 = 4.5. Inverted flight = 6.9 × .40 = 2.76.

The ratio of chord to beam components is obtained from Table 15 of Chapter 7 for the Clark Y section.

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The Halpin "Flamingo"

New All-Metal Six Passenger Cabin Monoplane Powered with a "Wasp" Engine has a Top Speed of 140 M.P.H.

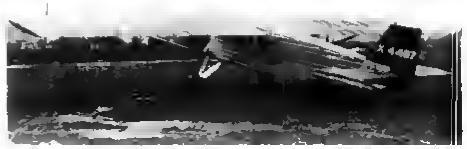
ONE OF the new designs that was exhibited for the first time at the All-American Aircraft Show in Detroit was the "Flamingo", built by the Halpin Development Co., Cincinnati, O. It is an all-metal cabin monoplane with a braced wing above the fuselage. The cabin houses five passengers in addition to the pilot, with provision for about 600 lb. of mail, luggage, or express. Powered with a Pratt & Whitney, 400 hp. "Wasp" engine, the Flamingo is stated to have a top speed of 140 m.p.h. and a landing speed of 48 m.p.h. It carries 150 gal. of gasoline, which should be sufficient for a range of 1,000 mi. The covering of the plane is unfinished, except for the tail, which is painted red for decorative purposes.

Only One Plane Built

Only one plane of this type, the "Miss Cincinnati", has been built though it is understood that orders are on hand for many more, and regular production will be under way shortly. The structure of the Flamingo has been simplified so that it will lend itself to large scale production economically. In addition, the construction is such that all parts may be easily inspected, repaired or replaced. The Flamingo is intended for the private owner or commercial operator either as a passenger plane or mail plane. It has ample power, can carry sufficient load and has good performance.

The wing is braced by struts from the lower fuselage longerons to a point at 58 per cent. of the semi-span of the wing. These bracing struts have an airfoil section and are supported laterally by a member between them attached at a point below the wing. In addition, there is a vertical member at this point connecting the lift brace to the wing. The wing itself is of all-metal construction using .014 in. sheet duralumin for covering. This covering, like that of the fuselage, is corrugated intermittently with four inches between each of the half round corrugations. It is claimed that this makes for lighter weight as well as reducing the air resistance by having less surface area than the usual type of corrugations. The corrugations provide the necessary strength to take local loads and withstand vibration. The covering is removable in panels to facilitate inspection or repair.

Internally, the members of the wing structure are conventional in shape, with all parts of metal; open sections are



Rear quarter view of the Halpin "Flamingo"

used wherever possible. The spars are of I section built up of a vertical sheet for the web with extruded duralumin angles riveted to it for the flanges. The web is solid, with ample steel fittings riveted to it. As the wing has the same section throughout, the ribs are all alike. There are 28 ribs, all of sheet duralumin with flanged lightening holes and flanged edges. They are built in three parts: the leading edge, center portion, and trailing edge; thus, they may be blanked out more cheaply than if they were all in one piece. In addition, as the wing may be put together in units, assembly costs are reduced. Compression members between the spars are of steel tubing with end fittings to take drag wires. The wing is divided into three bays with bracing only in the inner two bays. The outer bay utilizes the skin to take the

Continued on page 1241

The Halpin "Flamingo" all-metal cabin monoplane powered with a Pratt & Whitney "Wasp" engine

The Detroit S.A.E. Meeting

Two Day Aeronautical Session Included Visits to Local Factories, a Banquet, and a Discussion on Standardization of Parts

IN CONJUNCTION with the All-American Aircraft Show, the Detroit Section of the S.A.E., held a two day aeronautical session which began on April 17, with a visit to the Ford Airport and the Stout Metal Plane factory. Those who had previously visited the factory were much impressed by the progress made. Production work is being concentrated on the construction of the three engined planes which are being produced at the rate of one a week. A large amount of new machinery, mainly presses, breaks and section drawing machines have been installed, but the greatest progress has apparently been in the detailed design and in the shop practice. Detailed refinements and improvement is making the construction of these giant air liners much more simple. The engineers and their friends were shown around the airport, and the functioning of the air lines and the passenger sight-seeing flights explained to them. In the afternoon the S.A.E. Section visited the Aircraft Show.

The day was brought to a crowded climax with a banquet at the Book-Cadillac Hotel. Four hundred and thirty S.A.E. members and their guests attended the dinner.

The guests of honor were Edward P. Warner, assistant secretary of Navy for aeronautics and Prof. Alexander Klemin of the Guggenheim School of Aeronautics, New York University.

Meeting Addressed by Professor Klemin

An explanation and justification by Professor Klemin of the rules and conditions governing the $100,000 Guggenheim Safe Commercial Airplane Competition was the educational feature of the meeting. But entertainment was first supplied in generous measure, principally in the form, or rather forms, of several clever and easy-to-gaze-upon dancing girls. While this part of the entertainment was received with loud acclaim, a pilot recently returned from the nearby city of Windsor, Canada, was heard to say that he failed to see in what manner the young women referred to were contributing to the safety of aviation. And even Professor Klemin later found occasion to mention the dancers as excellent examples of streamline forms.

Assistant Secretary Warner found things of interest to say about technical progress which has been made in aviation during recent years and of the stimulus to further progress the Safe Commercial Airplane Competition offered to engineers. He introduced Professor Klemin as his old boss referring, it was inferred, to the pre-war days when Klemin was professor and Warner assistant professor of aeronautics at Massachusetts Institute of Technology.

The performanna required of the hypothetically safe airplane—take off, rate of climb, high and low speeds, stall, ground run, as well as detailed explanation of the obstacles to be overcome in attaining the desired results—was thoroughly gone into by the speaker. The rules of the Competition and recent articles by Professor Klemin suggesting technical devices and design features, which may be helpful to engineers competing, have been published in AVIATION.

It is possible with brakes, the speaker contended, to stop a plane within the prescribed 100 ft. Improvement in shock absorbing devices would, he suggested, permit of safe squash landings. The intricacies of wing slots and flaps were gone into. In stressing his points Professor Klemin frequently turned to face Bill Stout, Ivan R. Driggs, Bill Naylor and other airplane engineers who were seated at the speakers' table. He seemed to bave something to sell to these men. The impression made upon them was not evident from their interested but non-committal expressions.

Officers of the Aviation Division, Detroit Section S.A.E., were individually introduced to the audience. They were Capt. L. M. Woolson, aeronautical engineer, Packard Motor Car Co., Ralph Upson, widely recognized lighter-than-air designer and engineer, W. C. Naylor, chief engineer of the Stinson Aircraft Corp., William B. Stout, engineer and head of the Metal Plane Division, Ford Motor Co., Ivan R. Driggs, engineer and vice president Driggs Aircraft Co., and Jack Whitaker, much air-travelled aviation engineer of the Tidewater Oil Co.

Others introduced to the diners were Lieut. Walter Hinton, famed pilot of the NC-4 in the first Atlantic crossing by air; B. Russell Shaw, airport engineer, who has the difficult assignment of selecting and purchasing a site for Detroit's airport; Lieut. Walter Lees, who taught Gen. William Mitchell to fly and is one of the charter members of the Caterpillar Club, and Glenn L. Martin, oldest American airplane manufacturer (in experience only) now in the business.

Miss Warner, a sister of Assistant Secretary Warner, who has recently soloed, was in the ladies' balcony and was introduced. Miss MacGregor, a Canadian girl pilot, who flew in with Commander Byrd's Ford tri-engined plane sat at the speakers' table and was also introdnced.

Engineers Visit Packard Plant

On Wednesday April 18, the engineers spent the morning visiting the plant of the Packard Motor Car Co. Here they were shown the latest Packard developments in aircraft engines including the 24 cylindes X engine which Lieut. Al Williams used in his racing plane. The manufacturing methods used and the extreme care in the selection of material and in the machining of the parts proved of great interest to those who were more accustomed to the manufacture of automobile engines.

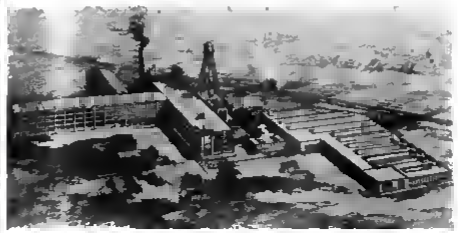
The real business of the Aviation Division of the S.A.E. began in the afternoon. Under the chairmanship of Assistant Secretary Warner the standardization of various aeronautical parts was discussed. This work was started some eight years ago but then allowed to lapse and received no active attention until about two years ago when several sub-committees were appointed to study the standards of uniformity applicable to commercial aeronautical parts. Assistant Secretary

Continued on page 1238

Wright Company Adding Buildings To Meet Demand for Whirlwinds

UNPRECEDENTED INCREASE in orders for Whirlwind engines from military and commercial users throughout the world has necessiteled new buildings and plant equipment at an investment of $3,500,000, according to a recent statement by Guy Vaughn, vice president of the Wright Aeronautical Corp of Paterson, N. J. Under the present plan of operation the new buildings will be completed and ready for occupancy by October 1.

A contract was recently signed for the erection of a four story building adjoining the original home of the Wright company on Lewis St., Paterson. This structure will contain 100,000 sq. ft. of manufacturing floor space. The first, second,



How the new home of the Wright Aeronautical Corp. of Paterson, N. J., will look when completed in October of this year.

and third floors will contain machine tools and new equipment for the production of the "J" series of engines. The fourth or top floor will be used as an office for executives, sales, and engineering personnal now housed in temporary quarters apart from the main plant. The basement of the structure is to be occupied by a cafeteria, hospital, and employment department for the entire personnel of the Wright company. Construction work has already been practically completed on a separate assembly and test plant containing 60,000 sq. ft. of floor space. This new building, one story in height, will be used by the assembly, test, service, and shipping departments.

During 1927 and the early part of 1928 the Wright company increased production until 90 engines a month were turned out. With the new assembly plant in operation, approximately 180 engines will be produced a month; and with the four story building completed, some 500 "J" type aircraft engines will be manufactured, it is claimed, each month.

New Personnel to be 2000

The original four story Wright plant on Lewis Street containing 00,000 sq. ft. and representing an investment of about $125,000, will be reconstructed under the new manufacturing plan so that each department will beve ample room for additional expansion as time goes on. With the increase in plant facilities, it will be necessary to add to the number of employees. The present quota of 1200 will be increased to more than 2000.

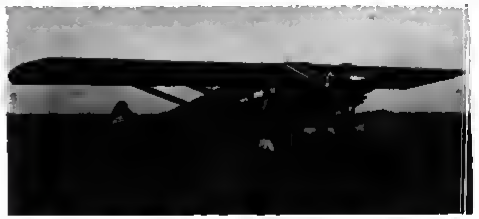
The Wright Aeronautical Corp. was formed in 1919 to take over the business of the Wright-Martin Aircraft Corp., and in 1920 it moved to Lewis Street. At that time, the concern was producing eight and 12 cylinder water cooled aviation engines. In the fall of 1923, the Lawrance Aero Corp and the Wright company joined to continue business under the Wright name. Successful development of the popular J-5 Whirlwind power plant followed later under the supervision of Mr. Lawrance and the encouragement of Army and Navy officials.

Travel Air Mfg. Co. Brings Out New Cabin Monoplane Type 6000

THE TRAVEL Air Mfg. Co., Wichita, Kan., recently completed a cabin monoplane that is to be produced under the designation "Type 6000." Though the wing is somewhat smaller than the previous Travel Air monoplane, Type 5000, the fuselage is essentially the same. Type 6000 is somewbet heavier and carries a greater load. It weighs 2,350 lb. empty and has a useful load of 1,650 lb. making the gross weight 4,000 lb. It is a braced wing type powered with a Wright Whirlwind engine. The cabin has places for four passengers and 150 lb. of baggage or pilot and 1,000 lb. of baggage.

The cabin is richly upholstered in blue velour with four removable wicker seats in the rear. The pilots' seats are in front fitted with dual side by side Dep nontrol, the interior is well lighted and well ventilated, and the windows extend the length of the cabin and are opened by cranks on the cabin walls. The pilot has excellent vision, though he sits somewhat lower than on the previous Travel Air monoplane designs.

Externally, the plane presents a good streamline appearance. The fuselage has straight sides rounded on the corners with the upper surface of the wing coinciding with the top of the fuselage. The wing is supported by two parallel struts on each side. The forward strut supports the compression



New monoplane now in production by Travel Air Manufacturing Co., Wichita, Kan.

member of the landing gear while the other two members hinge about the lower fuselage longeron. The corner between these two members, at the wheel, is faired to reduce the air resistance. Fuel tanks of 78 gal. capacity are placed in the wing roots giving the plane a range of about 700 mi. The high speed is 128 m.p.h. and landing speed 57 m.p.h. It has a climb of 750 f.p.m. and a service ceiling of 15,000 ft.

Gates Company of Newark Sells 10 Challenger Planes in 10 Days

METROPOLITAN AREA airplane market strength was recently demonstrated when the Gates Flying Circus & Aviation Corp., Newark, N. J., sold 10 Challenger planes in the first 10 days of its agency for that craft. The territory of the sales was Northern New Jersey and Southern New York including the metropolitan section. The Challenger plane is manufactured by the Kreider-Reisner Aircraft Co., Inc., of Hagerstown, Md.

Traveling Service Station is Used On Travel Air Field, Wichita, Kan.

PILOTS FACED with the necessity of a fast trip to Wichita, Kan., need not wire ahead to get gasoline and oil ready if they intend landing at the Travel Air Flying Field at that city, for a special service car is employed at this airport ready for action the minute a plane lands.

A one ton truck chassis furnishes the power and rolling equipment necessary to make this service station available at all points of the field. Upon the body of the truck is mounted a good sized gasoline storage tank, hand operated gas line

Walter Beach, president of the Travel Air company, watching the new rolling service station in action.

pump, rack for oil containers, compressed air tank with flexible hose connection, storage tank for water to service water cooled engines, a grease gun to lubricate rocker arms, and other contrivances needed to give complete service to planes. Gasoline is pumped through a special funnel using a chamois skin to preclude any possibility of water getting into the tank of the plane. This same funnel has attached to it a long chain which drags on the ground thus obviating possibility of fire from friction aroused by static electricity in adjusting the funnel into the gas tank or in the pumping process. On cold, wintry days when airplane engines are "stiff", this same truck serves hot lubricating oils to warm up the engines.

Charles Miller Named Production Head of Miller Airplane Products

LESLIE MILLER has announced the appointment of Charles Miller as production manager of Miller Airplane Products, Inc., of Los Angeles. With the addition of Mr. Miller to the staff of employees now engaged in producing OX-5 overhead and repair sets there is some prospect that the factory may soon be able to catch up with the flood of orders which has caused the plant to treble its equipment and employees in the past 60 days.

Although Leslie Miller has acquired 3000 sq. ft. more floor space, installed $9,000 worth of new machinery, and worked a night shift in addition to the regular force, he reports that he is still two weeks behind on shipments. Production has now reached such a pace, however, that he hopes within the next month to be able to ship the same day an order is received.

It is also reported that a new air cooled engine will be placed on the market next spring by Miller Airplane Products. This engine has been designed for great simplicity and durability and will be built in large quantities to sell at a low price.

Alexander Production Delayed Only Three Days by Fire

CONTRARY TO newspaper reports the recent fire that razed the doping and wing covering building belonging to the Alexander Aircraft Co., Denver, Col., destroyed only 15 sets of Eaglerock wings. The equipment is being replaced at once and the output of completed planes will only be delayed about three days.

The above information was supplied to AVIATION by E. S. Winship, sales manager of the Alexander Company.

Quick Motors Co. Now Producing A Nine Cylinder Air Cooled Engine

THE QUICK Motors Co., Wichita, Kan., is in production on the Quick radial engine, a Rhone engine rebuilt into a static design. It is a nine cylinder, air cooled with bore of 4.13 in. and stroke of 5.51 in. giving a displacement of 667 cu. in.

The compression ratio is 5 to 1. Dynamometer tests have been made on the engine and it has been shown to develop 125 hp. at 1450 r.p.m. The engine weighs 325 lb. or 2.6 lb. per hp. The manufacturer states that the fuel consumption is eight gallons per hour and oil consumption ½ to ¾ gal. per hr. The engine sells for $1750 with dual ignition including Santilla magneto, Champion spark plugs, and Zenith carburetor.

A Quick radial engine was installed in an American Eagle biplane and with this power plant it has a high speed of 115 m.p.h. and a cruising speed of 95 m.p.h. It climbs 1,000 f.p.m.

Commercial Aircraft Manufacturers Hold Meeting at the Detroit Show

THE SECOND meeting of the commercial aircraft manufacturers' branch of the Aeronautical Chamber of Commerce was held in Detroit on April 19 and 20. This was during the week of the All-American Aircraft Show which had gathered the manufacturers together from all parts of the country. The leading builders of commercial aircraft were present but unfortunately many of the smaller manufacturers found themselves so busy with their duties in connection with the Show that they were unable to attend the full conference. The subjects discussed were to a considerable degree the same as those which had been talked over at Wichita during the first conference and had to do with sales policies, dealer organizations, etc. A fuller account of the meetings will be given in next week's issue.

New Valley Air Service in Oregon Is Distributor of American Eagles

THE VALLEY Air Service has been organized to operate a flying school and general air service at Forest Grove, Ore. It has ordered four American Eagle commercial biplanes through the Mackenzie-Goff Aviation Co. of Portland, Ore., and has been appointed distributor for that plane in three neighboring counties. Members of the company are J. P. Livermore, C. L. Burlingham, and William Forbes. Livermore is chief pilot.

C. H. Holmes Named to Sales and Advertising Position with Prudden

C. H HOLMES, who for more than five years has been interested in aviation in California, has been appointed assistant director of sales and general advertising manager for the Prudden-San Diego Airplane Co, according to an announcement made by George H. Prudden, head of the concern

C H. Holmes, new assistant director of sales and general advertising manager of the Prudden company.

In addition to his aviation experience, Mr Holmes brings to the Prudden-San Diego Airplane Co a knowledge of advertising gained from many years work in this field of effort. He has been associated with many of the leading advertising concerns of Southern California, but of late has directed his efforts toward aviation, both from the sales and advertising angle

In taking over his new duties Mr. Holmes announced that he would seek to adopt, and carry out, many new novel features in his future advertising programs.

"Continuity of any one definite scheme, and particularly one outstanding word, which will create in the mind of the reader a swift impression of the subject involved, is an important factor in successful advertising," Mr. Holmes declared. Together with A. J. Edwards, who is sales director of the Prudden-San Diego Airplane Co., Mr. Holmes will carry forward the new program of sales helps formulated by the officials of the concern. The Prudden company manufactures an eight place, dual control, tri-engined metal monoplane.

Stout Air Service Will Operate Detroit-Chicago Passenger Line

PASSENGER AIRPLANE service between Detroit and Chicago, operating on a regular schedule and using three-engined Ford monoplanes, which have been used on the Detroit-Cleveland line, was recently announced by the Stout Air Service, Inc., of Detroit. The announcement was made on the third anniversary of the Ford Motor Co into the commercial airline field.

The Detroit-Chicago line, it was said, really is an extension of the Detroit-Cleveland line. A third division between Cleveland and Chicago will be put into operation later, making a triangular passenger service between the three cities. Both morning and afternoon departures from each of the cities is planned, according to the announcement.

Although the schedules have not been worked out it is planned that a plane will depart from Ford Airport, Detroit, about 8 A.M. and will leave Chicago on the return trip about 4 P.M. The scheduled flying time will be 2 hr. 30 min., thus enabling Detroit business men to have approximately four hours to transact business in Chicago. A similarly arranged schedule is now in operation on the line between Detroit and Cleveland. The Chicago line will be so scheduled, Stout officials say, that timely connections may be made with planes operating out of Chicago for St. Paul, Kansas City, Salt Lake, and Los Angeles. The new division will begin operation as soon as additional equipment can be obtained.

Two New Mexican Designed Planes Built in Tijuana, Lower California

TWO MONOPLANES, the first of which was completed late in March, are to be flown from Tijuana, Lower California, to Mexico City this spring. These airplanes, representing the first serious effort on the part of the Mexican Government to design and construct its own craft, were built by the Tijuana Aircraft Co of which Gov. Abelardo Rodriguez of Lower California is head. They were constructed from plans furnished by the Mexican War Department and adapted by William Waterhouse, Los Angeles designer.

The first plane is all metal except for the linen covering on wings and fuselage. It has a gasoline capacity of 90 gal. The second plane will carry a fuel supply of 350 gal., 90 gal. in two wing tanks and 240 gal. in a large fuselage tank. The plane has a span of 41 ft. 6 in. and weighs 2,505 lb with pilot and fuel. A Story wooden propeller is used which is 9 ft. 4 in. in length and 5 ft. 6 in. in pitch.

In test flights, a six cylinder German engine, said to be of the B.M.W. type, was used. This power plant develops 185 hp. at an 8,000 ft. altitude and weighs 600 lb. installed. For flights to Mexico City, however, it is planned to use the Whirlwind engine.

One of the new Mexican monoplanes completed but for the engine cowling.

The first plane will be delivered to the technical university at Mexico City for further experimental work. This type, if successful, will be used by the Mexican Army and Mexican air mail service. Capt. Louis Farrel, one of Mexico's most experienced fliers and a former Kelly and Brooks Field student, will fly both planes to Mexico City, taking the first through with stops at Mexicali, Sonoro, Manzatlan, and Jalisco. Following this flight he will return to Tijuana attempt a non-stop flight to Mexico City in the second plane, and later a non-stop flight to New York.

Minnesota's Northwest Aircraft Show is Postponed to May 24-26

ANNOUNCEMENT HAS been made that the Northwest Aircraft Show, which was to be held at the St. Paul Airport April 26-28, has been postponed to May 24-26. The Wold-Chamberlain Field in Minneapolis, furthermore, will be the scene of the show rather than the St. Paul Airport because filling and dredging will be under way at the latter field at the time of the exposition.

License Requirements More Strict In New Air Commerce Regulations

NEW AMENDMENTS to Air Commerce Regulations, effective June 1, have been announced by the Department of Commerce, with greater flying safety the outstanding motive of the rulings. Increased license requirements for both pilots and aircraft and stricter flying regulations are the chief changes.

Under the new rules a licensed instructor must have 200 hr. solo flying compared with the former 50. Private pilots also must meet additional tests. They must show 10 hr. actual solo flying experience, whereas formerly such licenses were granted on satisfactory demonstration of flying ability.

Aeronautical knowledge tests are also made more stringent. Examinations in separate subjects to pilots and mechanics must each be passed with a grade of 70 per cent., instead of the former average of 70 per cent. Examinations for industrial pilots now include primary tests in elementary engine and plane mechanics and rigging, and on Air Commerce Regulations in addition to the air traffic rules as hitherto required.

Practical experience requirements are raised for mechanics' licenses. Engine mechanics must have, instead of a former "sufficient knowledge", at least two years' actual experience on internal combustion engines. Examinations on that portion of the Air Commerce Regulations pertaining to the operation and inspection of aircraft must also be passed successfully, and mechanics must show that they have a sufficient knowledge of aircraft engines, their accessories, including ignition systems, inspecting, maintenance, repair, and overhaul.

Passengers Must Be Sober

Flying itself is also more strictly regulated by the new amendments. The carriage of explosives other than fuel in planes is prohibited. Passengers under the effect of liquor or habit-forming drugs are not permitted to be taken up by a licensed pilot. Formerly the requirement covered only the pilot.

Other sections of the new amendments prohibit acrobatic maneuvers at less than 1,500 ft., and taking off or landing on any public street or highway under ordinary circumstances without the consent of the local governing authority and the approval of the Secretary of Commerce.

Additional clauses have been added to the section of the Air Commerce Regulations pertaining to revocation and suspension of license. The new rules consider any false statement in a license application grounds for revocation or suspension. Furthermore, all licensed planes are required to carry certain data stencilled on the side of the plane nearest the passenger's entrance. Permission is given for planes which have been issued an approved type certificate to carry an insignia indicating this approval, in order to inform the public that the plane is of a type approved by the Department.

Another new section adds "before any license is renewed the Secretary of Commerce may in his discretion require the holder of such license to undergo any of the theoretical or practical tests prescribed as requisites for the original license."

George Miller Becomes Student Instructor at the Dycer Field

GEORGE MILLER, well known Southern California pilot and instructor, has accepted the position of student instructor at Dycer's Airport, Los Angeles. Miller will include the elements of navigation and meteorology in his course. The present enrollment at the field is 85.

Navy Tests Vought Corsairs Fitted With Amphibian Type Landing Gear

THREE VOUGHT Corsairs, fitted with experimental amphibian type landing gears, are undergoing service tests in the maneuvers of the Pacific Fleet of the U. S. Navy. The planes are standard Vought O2U biplanes powered with Pratt & Whitney Wasp engines. The seaplane installation resembles that of the standard service type with a single main float and wing tip floats. The main float is fitted with retractable landing wheels for land or aircraft carrier operations.

Two of the installations were made at the Naval Aircraft Factory, Philadelphia, Penna., while the other was made at the factory of the Chance Vought Corp., Long Island City, N. Y. The design effected at the Naval Aircraft Factory was made with the permission of the Loening Aeronautical Engineering Corp., New York City. This closely resembles the landing gear of the standard Loening amphibian. The wheels rotate about the chine of the float with the shock absorbing member set into an opening in the float. The wheel is retracted into the float with only part of the wheel end

One of the Vought Corsairs fitted with experimental amphibian landing gear

tire showing. The wheel on the Vought installation does not retract into the float but is merely raised clear of the water. It has been stated that these planes are 20 m.p.h. faster than any service type of amphibian. In addition, they can be catapulted much easier than a flying boat.

Los Angeles Times Begins Regular Aerial Delivery of Morning Papers

SAID TO be the first paper in the world to arrange for regular distribution of copies by airplane, the Los Angeles Times is sending the 2 A.M. edition to San Francisco and mid points for an experimental period of time to discover the value to the newspaper of such a practice.

The service used is supplied by the three engined Fokker monoplane operated by Western Air Express. This plane now leaves Vail Field, Los Angeles, each morning shortly after 2 A.M. with its load of papers. The flight to San Francisco is made in approximately 4 hr. 34 min. If this method of distribution sufficiently increases the northern circulation of The Times the delivery of papers by plane will be widely extended.

The bundles of papers have long streamers attached to them and delivery at way points is made by flying low over the field of the town to which delivery is made and kicking the bundles overboard as the plane passes above the field.

Little Rock Aero Club to Stage Flying Circus on Sunday May 6

A FLYING circus is to be staged by the Flying Razorback Club of Little Rock, Ark., whose members are enlisted men of the 154th Observation Squadron, on Sunday, May 6, at the Little Rock Intermediate Air Depot. The circus date directly precedes the Confederate Reunion to be held in Little Rock this year.

Flying exhibitions, parachute drops, etc., will be given at the circus but every care, it has been pointed out, will be taken to eliminate all exaggeration of the hazards of flying with which overly-dangerous stunting impresses the public. A demonstration of radio communication between plane and ground, close formation flying, drop testing of parachutes, and such events will be offered.

The circus is to be financed through the sale of souvenirs—winged razorback pigs—and through the operation of refreshment and other concessions.

Air Transport Service is Offered By Kansas City Bus Line Company

AIRPLANE TRANSPORT service is now being offered by the Ni-Sun Bus Lines of Kansas City, Mo., formal opening in the new field having recently been announced by Walter A. Nisun, president of the company. Passenger plane service out of Kansas City to any part of the country is now available, but regular schedules, states Mr. Nisun, will not be attempted until later.

When not operating on distant flights, the company's planes will be used for sightseeing and taxi service at the local field. The charges on long flights will be $.35 per mile for one passenger, $17½ for two passengers, and $16⅔ for three persons, and $12½ for four.

Boeing Planes to Have Special Air Speed Indicators For Passengers

PASSENGERS CARRIED in the large Boeing transport planes between Chicago and San Francisco will soon be able to note, without stirring from their seats, just how fast the plane is traveling. Large air speed indicators six inches in diameter and registering up to 160 m.p.h. will be installed in the cabin of each airplane, it has been announced. The speed indicators will be manufactured by the Pioneer Instrument Co. of Brooklyn, N. Y.

"Pathfinder" Plane Flies 393 Hr. Without Need of Major Repairs

A RECORD of 393 hr. in the air without a major repair or engine overhaul, has been made by the "Pathfinder", a large three-engined transport biplane, in the West Indian Express Service between Santiago de Cuba, Port au Prince, Haiti, San Juan, Porto Rico, and Santo Domingo City. The Pathfinder is manufactured by the Keystone Aircraft Corp. of Bristol, Penna.

During its six months of operation, the biplane has carried tons of mail and express matter and hundreds of passengers in safety. On Col. Charles A. Lindbergh's recent good will tour through that section, the plane acted as his escort, carrying a considerable portion of his following over the West Indian route. The Pathfinder is the first three-engined biplane commercial transport to be built in America.

Iowa State College, Ames, Ia., Now Offers Two Aero Courses

TWO COURSES in aviation have just been started at the Mechanical Engineering Department of Iowa State College, Ames, Iowa, under the direction of Prof. Earl B. Smith.

One course is commercial aviation, a non-technical course giving the fundamentals of air transportation, economics, organization, laws and regulations, insurance, types of aircraft, airports and airways, and navigation. Another course—Aerodynamics and Airplane Design—is given for senior engineering and graduate students. This course includes the technical and engineering phases of the subject. A number of planes, engines, and other items of aviation equipment have been received from the surplus stock of the Government for use in instruction.

Form Two New Airport Companies In Lake Front Cities of Wisconsin

TWO NEW airport companies were recently incorporated in Wisconsin, according to reports. One, the Southern Wisconsin Airways, Inc., of Kenosha, has been formed by Walter J. Kaufmen, E. Hedeen, and H. L. Kaufman, the other, the Sheboygan Airport Co., was incorporated by C. F. Pratt, A. W. Sommer, and G. W. Buchen. Both cities lie on Lake Michigan, Sheboygan being north of Milwaukee and Kenosha south of that city.

Where Planes of the Nations Meet

Evere Airdrome at Brussels, Belgium, which is the daily rendezvous of international air liners from England, France, Germany, Belgium, The Netherlands, and other continental countries. The photo shows, from left to right, a French monoplane, a Belgian biplane, a Handley-Page from England, and a large German monoplane.

Key West-Havana Passenger Line Reported to be Highly Successful

PASSENGER AIRPLANE service between Key West, Fla., and Havana, Cuba, which started on Jan. 16 of this year, has been highly successful according to figures released by J. T. Trippe, president of the Pan-American Airways, Inc., of New York, operators of the new line. Information given out shows that a total of 607 passengers were carried from January 16 to April 1—an average of more than 250 a month.

Each plane operated on this line carries a high powered radio set enabling the pilot to know his position and maintain contact with shore bases at all times. In order to better this service, a special radio control station will be placed in operation at Key West October 1. Here a radio operator will be on duty at all times and in continuous touch with planes en route, while a radio beacon will advise the pilot of his position on the course.

The Pan-American Airport at Havana, Cuba.

Phillips-Froberg Company to Open Seattle-British Columbia Service

PASSENGER AIR service, sponsored by the Phillips-Froberg Flying School, is to begin shortly between Seattle, Wash., and British Columbia, according to an announcement by Don S. Phillips, president of the Phillips-Froberg company. Inauguration of the service is held up only by lack of terminal facilities in Seattle, Phillips declares.

Phillips and his associates expect to use a 12 passenger Boeing plane in the new service. It would be powered with three Wasp engines. The service, which is to parallel the route to be followed by the British Columbia Airways, Ltd., which is inaugurating a similar line in May, will be the fourth passenger air line operating out of Seattle, as passengers are now being carried to points south of Seattle by the West Coast Air Transport airplanes and the Pacific Coast Transport planes.

California School of Aeronautics Now Teaches Parachute Jumping

A DEPARTMENT of parachute jumping and wing walking was recently opened by the California School of Aeronautics of Los Angeles, it has been announced. The new department, a branch of the company's flying school, offers training in parachute jumping with packing and handling of the various types of chutes fully covered in the course.

The department is in charge of Bob West, a veteran of the flying circus activities. West states that at the present rate of enrollment, jumpers will soon be turned out at a rapid rate.

Montreal-Albany Air Mail Service To be Inaugurated During Spring

AN INTERNATIONAL air mail service between Montreal and Albany, N. Y., is to be inaugurated this spring as soon as navigation opens on the St. Lawrence River, according to the Post Office Department at Ottawa, which has awarded the contract for the carrying of all classes of mail between the two cities.

The contract, involving the sum of $95,000 annually, has been let to Canadian Colonial Airways, Ltd., with headquarters at Montreal and is for a service operating four days a week.

Mail steamers will be met at Father Point, Que., by planes of the Canadian Transcontinental Airways, Ltd., with headquarters at Quebec City, and rushed west to Montreal where it will be sorted and trans-shipped for Ottawa, Albany and Toronto.

The service between Montreal and Ottawa will be operated twice a week by Canadian Transcontinental Airways, while that between Montreal and Toronto will be carried on by Canadian Airways, Ltd., of Montreal, making four trips weekly.

The service between Montreal and Albany will be carried on throughout the entire year even after the close of the river navigation. The gain in time on all incoming mail will be slightly better than two days. At Albany connections will be made with the transcontinental service of the United States.

Experiments carried on last summer and during the winter months by the Civil Aviation Branch of the Canadian Air Services have proved very successful. Most of the experimental work has been done by Squadron Leader J. H. Tudhope of Ottawa, who is in charge of air mail routes.

New Dept. of Commerce Bulletin Contains State Aeronautic Laws

INFORMATION BULLETIN No. 41, an abstract of state laws on aeronautics, was recently issued by the Aeronautics Branch of the Department of Commerce, Washington, D. C., and may now be obtained on application. The bulletin gives the text of a proposed uniform state law, then sets forth the aeronautical laws now enforced in the states of Arkansas, Colorado, Kansas, Kentucky, Louisiana, Maine, Massachusetts, Michigan, Minnesota, New Jersey, Oregon, Pennsylvania, Wisconsin, and Wyoming.

Announcement is also made by the Aeronautics Branch that a second edition of Information Bulletin No. 4 has been issued. This bulletin lists the various aero clubs and aeronautical organizations in the country.

Changes in Staff are Announced By Two Mid-West Flying Schools

ANNOUNCEMENTS OF staff changes were made recently by the Lincoln School of Aviation at Lincoln, Neb., and by the Kansas City Flying School, Kansas City, Mo. George E. Johnson, president of the former company, states that the services of Harold Phillips as director of ground work and repairing, have been secured.

The Kansas City Flying School, on the other hand, announces that L. L. Grismer, the company's chief pilot, has resigned to accept a position on the Pacific Coast. Grismer, according to M. C. Anderson, president of the Kansas City Flying School, has had well over 2,000 hr. in the air during the past five years, most of it in instruction work, and has won many honors in competitive flying.

R. W. Cramer & Co. is Importing Hasler Tel Aircraft Recorders

R. W. CRAMER & Co., New York City, is importing Hasler Tel Recorders for aircraft. The instrument consists of a Hasler tachometer, revolution counter and clock all connected to a visible recording sheet. During the time that the airplane engine is running, the recording sheet moves at a set speed, and ceases to travel five minutes after the engine stops, thus showing for any time, the speed and total revolutions of the engine. A scriber connected to a clock, marks the sheet. The scriber moves vertically with the time of day and therefore when the engine is stopped makes a vertical line. When the engine is running the sheet moves horizontally causing a sloping line. The upper edge of the sheet is marked in minutes to show the elapsed time that the engine was running. The engine speeds are recorded by another scriber connected with the speed indicator and, any point on the graph represents the engine speed at that instant. Dots on the lower edge of the sheet are recorded every 20,000 revolutions of the crankshaft. Therefore the number of dots multiplied by 20,000 will give the total engine revolutions for each trip. The total engine revolutions, from the time the instrument was installed, is indicated on a revolution counter directly above the dial on the front of the instrument.

The Hasler Tel Recorder

A device of this nature is very useful for mechanically recording total engine time and time between overhauls. The record will also indicate the time of the plane in the air and the engine speeds during the trip. The complete instrument is carried in a compact case connected to the engine in the same way as the ordinary tachometer.

E. P. Hurd of Detroit to Produce Monoplanes of the Low Wing Type

AFTER OVER two years of experimentation with a low winged monoplane, the Aeronautic Division of E. P. Hurd, manufacturer of locks and chains, Detroit, Mich., has announced that it is now ready to turn these planes out on a production basis. In the fall of 1926 the first plane was designed and built. It was submitted to tests during 1927 Encouraged by the performance during these tests it was recently decided to go into production on this model.

Designed for 60-80 Hp. Engine

The plane is a low wing monoplane designed for a 60-80 hp. engine, such as the LeBlond Sixty, Anzani, or Ryan-Siemens. The first plane was powered with a 60 hp. Air-Cat engine and with this power plant it is said to have a high speed of 100 m.p.h. and a landing speed of 35 m.p.h. It climbs to 3,000 ft. in 5 min. Because of the low wing position and the excessive wing area, to reduce the landing speed, the plane has an exceptionally quick take off making it adaptable for operation in a small field.

The wing is of conventional construction using a high lift airfoil of the Heinkel-Lachman, Gottingen type. The spars are of spruce and the ribs of plywood. The leading edge of the wing is reinforced with sheet aluminum. The wing is attached to the lower fuselage longerons and braced by compression members of plywood and tubing carrying part of the load to the upper longerons.

The fuselage is of welded steel tubing with no wire bracing. It is of rectangular design rounded at the top. The gasoline and oil tanks are of welded sheet aluminum located behind the fire wall and in front of the cockpits. The seats are arranged in tandem with dual control as standard equipment. The passenger seat, in the front, is on the center of gravity so that the balance is not disturbed when no passenger is carried. In addition the horizontal stabilizer is adjustable in flight. The landing gear is of the divided type with 26 in. by 4 in. tires. Provision has been made for the installation of either pontoons or skiis. The tail skid is of the movable leaf spring type.

The following specifications were supplied by the manufacturer:

Span	32 ft. 4 in.
Length, overall	20 ft.
Height, overall	6 ft.
Wing chord	5 ft. 3 in.
Wing area	160 sq. ft.
Weight empty	740 lb.
Disposable load	535 lb.
Gross weight	1275 lb.
High speed	100 m.p.h.
Cruising speed	85 m.p.h.
Landing speed	35 m.p.h.
Normal range	340 mi.

New Company is Formed in Toledo With First Airplane Already Built

E. H VAN VALKENBERG, designer and pilot, has incorporated the Van Valkenberg Aircraft Co. in Toledo, O., at a capital of $100,000, according to recent announcements. Van Valkenberg's first Toledo plane has already been built and is now ready for trial flights. It is a monoplane of 35 ft. 8 in. span with a fuselage 26 ft. 6 in. in length. The only wood used in the plane's construction is said to be the wing spars, pieces made of routed spruce.

The plane has a capacity of four passengers and has triple controls, two in the front cockpit and one in the rear. It is a cabin type craft but is so designed that unobstructed visibility is reported to be afforded from the rear cockpit, which can be left open if so desired. A Ryan-Siemens nine cylinder engine powers the plane.

Van Valkenberg heads the new company, while G. F. Wagner is secretary. The first plane, the company announces, will be delivered to Dr. Leland E. Phelps of Toledo who will use it commercially.

Aerial Photo Co. of Oklahoma City Is Formed to Offer Survey Work

AERIAL SURVEY work is now offered by the Aerial Photo Co. of Oklahoma City, a concern recently formed by Clint Johnson and W. E. Bleakley, local aviators. A large aerial camera has been purchased, and photography work will now be done for municipalities and public service organizations throughout the Middle West.

Both Johnson and Bleakley received training at the Government aeronautical school at Austin, Tex. Flying instruction was completed at San Antonio and Fort Sill. A series of pictures for the Daily Oklahoman was the first business done by the new company

Minn-Wis-Sippi Airway, Inc., Named Travel Air and Driggs Dart Agent

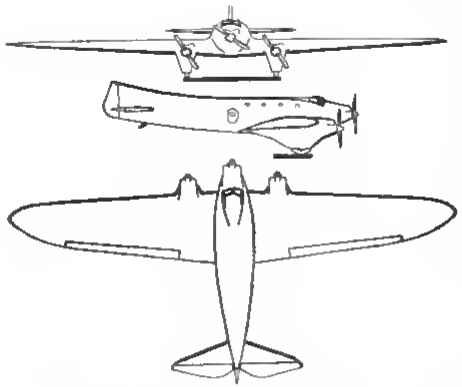
APPOINTED TRAVEL Air Dealer under the Roth-Downs Airways, Inc., of St. Paul, the Minn Wis-Sippi Airway, Inc., is now operating at Biesanz Field which adjoins the western boundary of the Government field three miles west of Winona, Minn The company also is agent for the Driggs Dart plane in this Southern Minnesota section, which includes the cities of Red Wing, Owatonna, Lake City, Austin, Albert Lea, Mankato, and Wabasha. The Driggs Dart is a light plane manufactured by the Driggs Aircraft Corp. of Lansing, Mich.

Officers of the Minn-Wis-Sippi company are B J Johnson, president and treasurer; George Pelowski, vice president; and Chester Ritt, secretary. In addition to being agent for the two planes named, the company will conduct a passenger and express flying service and sell various aircraft accessories.

Rene Couzinet Constructs Special Three Engined Monoplane in Paris

THE FRENCH designer Rene Couzinet has recently completed in Paris what is apparently a most refined design of three engined plane As can be seen from the line drawings much ingenuity and skill has been put into blending the engines, wheels and control surfaces into a homogeneously streamlined unit. Tests are now being conducted on the plane and should they be successful the plane will probably make a trans-Atlantic attempt this summer.

The maximum thickness of the wing is a little over three feet and it tapers towards the tip both in plane form and thickness Tha spars are of wooden box type construction



Three view drawing of the Couzinet three engined monoplane

and the wing is veneer covered. Tha fuselage is also built of wood covered with veneer An unusual feature is the great height of the fuselage towards the rear permitting the elimination of the vertical fixed stabilizer The plane is fitted with three 180 hp Hispano-Suiza engines all of which are accessible while in flight As can be seen from the specifications table the weight per square foot and per horsepower is quite high when the plane is fully loaded

Specifications:

Span	89 ft 1 in
Length	51 ft. 2 in
Chord	16 ft. 4 in.
Area	991 sq ft.
Weight empty	8,580 lb
Useful load	11,220 lb
Weight per sq ft.	19 lb.
Weight per hp	28.6 lb.
Estimated speed	110-140 m.p.h.

REVIEWS

N.A.C.A. Technical Note No. 280 Drag of Exposed Fittings and Surface Irregularities on Airplane Fuselages by Donald H. Wood.

Measurements were made on fittings taken from a typical fuselage to determine whether the difference between the observed full size fuselage drag could be attributed to the effect of fittings and surface irregularities found on the full size fuselage and not on the model It was found that there are wide variations in the drag coefficients for different fittings. In general those which protrude little from the surface show very low and almost negligible drag The measurements show, however, that a large part of the difference between model and full scale test results may be attributed to these fittings.

N.A.C.A. Report No. 281. The Effects of Fuel and Cylinder Gas Densities on the Characteristics of Fuel Sprays for Oil Engines, by Wm. F Jonahum and Edward G. Beardsley

The start, growth, and cut-off of single fuel sprays produced by automatic injection valves were recorded on photographic film by means of special high-speed motion-picture apparatus This equipment, which has been described in previous reports, is capable of taking 25 consecutive pictures of the moving spray at the rate of 4,000 per second

The penetrations of the fuel sprays increased and the cone angles and relative distributions decreased with increase in the specific gravity of the fuel The density of the gas into which the fuel sprays were injected controlled their penetration This was the only characteristic of the chamber gas that had a measurable effect upon the fuel sprays. Application of fuel-spray penetration data to the case of an engine, in which the pressure is rising during injection, indicated that fuel sprays may penetrate considerably farther than when injected into a gas at a density equal to that of the gas in an engine cylinder at top center.

Tibbs Flying School of Oklahoma City Named Agent for Eaglerock

AGENCY FOR the Alexander Eaglerock plane for Oklahoma City and the Southwest States has been taken, it has been announced, by the Tibbs Flying School of Oklahoma City. Flying instruction will be offered to plane purchasers and regular students as in the past, states Burrell Tibbs, president of the company

The Standard Roofing and Materials Co. of Oklahoma City has purchased an Eaglerock to be used in transporting company officials to the various state branches. The Southwest Airways Corp of Oklahoma City made this sale.

Bremen Repaired for Trip to U. S. With Parts Brought by Ford Plane

ARRIVAL OF the Junkers monoplane Bremen at Lake St Agnes, Quebec, is awaited as AVIATION goes to press. The tri-engine Ford relief plane has arrived at Greenely Island, 780 mi to the northeast, with repair parts for the damaged trans-Atlantic plane, and it is reported that with the cessation of a storm in the region of Greenely Island the repaired Bremen and Ford will fly back bearing Baron Gunther von Hauenfeld, Capt. Herman Koehl, and Maj. James Fitzmaurice, the fliers who first crossed the north Atlantic from the East. Ovations await the three in New York City, Washington, D C, Philadelphia, Chicago, and other centers.

The Ford relief plane flew from Detroit as the All-American Aircraft Show came to a close After picking up Major

Trussing the damaged Bremen at Greenely Island in preparation for repair work

Fitzmaurice, who had flown to Murray Bay with Schiller, and Ernest Koeppen, crack Bremen mechanic who followed the fliers across the Atlantic in a liner, the large all-metal plane was flown on to Greenely Island by Bernt Balchen. It carried with it engine tools, repair parts, 60 gal of Benzol to fuel the Bremen, and general food supplies and equipment.

The first plane to reach Greenely Island to succor the fliers was a Canadian Transcontinental Airways Fairchild cabin monoplane powered with a Pratt & Whitney Wasp engine.

Major Fitzmaurice and Duke Schiller arrive at Seven Islands in the Wasp powered Fairchild cabin plane which first reached the isolated fliers.

This plane was flown through heavy weather by Duke Schiller, who was accompanied by Dr. Louis Cusmner, technical director of the Canadian company. Schiller, a skilful pilot, met the adverse weather conditions well, soon landing the plane at Greenely Major Fitzmaurice was then chosen to return in the Fairchild plane to Murray Bay in order to make arrangements for the shipping of repair parts for the Bremen. At Murray Bay, Fitzmaurice was met by Herr Junkers, daughter of the Bremen's designer, who had flown to Canada in the Junkers plane in use at Curtiss Field L. I, N. Y.

Floyd Bennett, who piloted the "Josephine Ford" over the North Pole for Comdr Richard E Byrd in 1926, and Bernt Balchen, who was one of the crew of the Fokker plane "America" which flew the Atlantic last year, brought the Ford relief plane from Detroit to Canada. On arrival in Canada, however, Bennett became seriously ill with pneumonia and had to be removed to a hospital in Quebec. Col. Charles A. Lindbergh has hurriedly flown north with serum for the stricken flier, and Commander Byrd has also left to be at his friend's bedside

Planes Won Where *Montcalm* Failed

Damages to the landing gear and propeller of the Bremen when it landed on the little barren island between Newfoundland and Labrador on April 13 stopped further progress of the trans-Atlantic fliers until outside aid arrived. It was quickly shown, however, that the fliers' first stop on this continent was an almost incredibly isolated spot, and hence more than a week has been spent in attempting to pierce the stormy section to Greenely Island and bring needed supplies. The steamer *Montcalm* failed to break through the ice of the strait to reach the island, and therefore airplanes have been employed to solve the problem They have shown their staunchness and worth under the adverse weather conditions encountered.

Gilbert G. Budwing is Named Chief Of Government Inspection Service

GILBERT G. BUDWING, it has been announced by the Aeronautics Branch of the Department of Commerce, has been appointed chief of the inspection service. He will be in charge of airplane and engine inspectors, the examining of pilots and aircraft, the investigation of air accidents, and the enforcing of air traffic rules.

Mr Budwing replaces Ralph G. Rockwood, who has become associated with the Fairchild Aviation Corp. Formerly one of the early air mail pilots, Budwing has had considerable experience in flying He was chosen from the ranks of aeronautic inspectors, having been on duty until recently in the North Carolina section

Chicago and Gulf Airways Plans A Chicago-Mobile Passenger Line

CHICAGO AND Gulf Airways, Inc, a company that will operate a passenger air line between Mobile, Ala, and Chicago, will inaugurate service shortly, it is announced. The company, which is a Mobile concern, plans a 10 hr schedule between the two cities with a stop en route at Memphis for lunch.

The members of the company are O A. Coons, Oak Park, Ill, president; A. J. Gibson, Chicago and Mobile, vice president; R. M. Ressler, Los Angeles and Mobile, secretary, J B Gibson, Hurley, Miss., treasurer; and John Corville, Pascagoula, Miss. W G Taylor, Mobile attorney, is counsel for the corporation

Wilkins and Eilson Fly Vega Plane Across Polar Seas to Spitzbergen

A FLIGHT across the world's top, the reverse of that of Amundsen's 1926 journey in the dirigible Norge, was accomplished April 15-16 when Capt George H Wilkins, explorer, and Lieut Carl B Eilson, pioneer Alaskan flier, flew a Whirlwind powered Lockheed Vega monoplane from Point Barrow, Alaska, to Dead Man's Island, lying 25 mi. north of Green Harbor, Spitzbergen The trip of 2,200 mi was made non stop in 20 hr. 20 min., the line of travel being north from Point Barrow to Grant Land, some 300 mi. to the right of the Pole, then south and east in a line toward Spitzbergen Discovery of land in the Polar regions to the north of Alaska was the purpose of the trip, but only frozen sea wastes were observed.

Flew on Great Circle Course

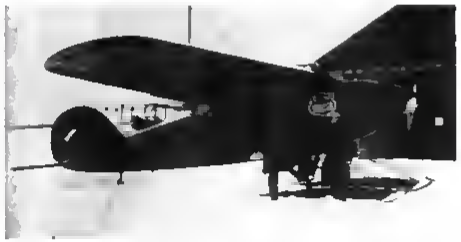
The fliers took off from Point Barrow on Sunday April 15 at 10 A M after failing three to get into the air on previous days because of troubles with the snow-built runway Alaska behind, the Vega was headed toward Grant Land on a great circle path necessitating frequent changes in course. The altitude averaged 1000 ft., with now and then an ascent to 3000-4000 ft. to cross cloud banks The average speed was 107-110 m.p h.

Freedom from menacing weather conditions continued until Wilkins and Eilson suddenly encountered a heavy storm when nearly within sight of their goal, a forced landing on Dead Man's Island resulting The plane, luckily, was undamaged, and after a five day wait for better weather, the fliers left the uninhabited island, where they had knolled in the Vega's cabin, and flew to Green Harbor, Spitzbergen, on Saturday April 21

Many Preparations Preceded Flight

Preparations for the flight across the Polar tract were extensive. Finally in readiness, the plane was shipped to Fairbanks, Alaska, then flown to Point Barrow, 500 mi. to the north. Many tests of the plane were made in this icebound and intensely cold section between March 19, the date of arrival, and the take off on April 15 for Spitzbergen

The Lockheed plane used by Wilkins and Eilson is a stock model with the exception of the extra fuel tanks and ski landing gear It was built by the Lockheed Aircraft Co of



Capt. George Wilkins and Lieut Carl Eilson standing in front of the Lockheed Vega monoplane in which they flew from Point Barrow, Alaska, to Spitzbergen

Los Angeles, Calif. The instruments used in the trans-polar flight included two compasses, one fast and one slow type, two altimeters, a turn and bank indicator, fore and aft inclinometers, an air speed indicator, and others of the usual type. For navigation purposes a large ship's compass, a bubble sextant, a pocket sextant, four special watches, drift indicator, course and distance calculator, nautical almanac, and various special charts and tables were carried. Because the plane is of wooden construction, magnetic disturbances of the compasses were minimized in the flight.

The plane, it is understood, weighed 1,800 lb. empty and 5,200 lb fully loaded with fuel, oil, and equipment. The combustible load is said to have been 370 gal. of gasoline and 12 gal of oil Authoritative figures have not been obtainable because the fliers are isolated at Spitzbergen as AVIATION goes to press. The Lockheed Vega was described in detail in the Aug. 22, 1927 issue of AVIATION

In landing at Green Harbor, the under part of the plane was slightly damaged With this repaired, the fliers will return to the United States, where preparations will be made, it is said, for a similar South Polar flight Before returning to America, however, the fliers plan to visit Norway, England, and other European points where arrangements for ovations are being made

West Coast Correspondent Flies To All-American Show in Detroit

R. G. LANE, Oakland and Sao Francisco correspondent of AVIATION, flew by Western Air Express from Sao Francisco to Salt Lake City and by Boeing Air Transport from Salt Lake City to Chicago en route to the All-American Aircraft Show at Detroit Mr. Lane hoped to secure transportation from Chicago to Detroit by air, but accommodations were not available.

In the flight between Salt Lake City and Chicago, Mr Lane had as a fellow passenger a Japanese newspaper correspondent now attempting to break the round-the-world travel record

Mid-Continent Company in Montana Now Distributor of the Travel Air

DISTRIBUTION of the Travel Air planes in the State of Montana has been taken over by the Mid-Continent Aircraft Corp. of Miles City, Mont. First delivery was made recently when the company received an OX-5 Travel Air biplane.

The concern will continue to operate its flying school and offer general commercial service in addition to the sales work. The corporation was organized by Frank Wiley and I. Packard and is the outgrowth of the Yellowstone Flying School which began operations last October at the Miles City Airport.

J. M. Johnson is Now Associated With Buhl Company Sales Division

J. M. JOHNSON, a veteran flier, has resigned his position with the Department of Commerce to become associated in a sales capacity with the Buhl Aircraft Co of Marysville, Mich Johnson plans to leave shortly on a tour of the country to demonstrate the Buhl plane

J. M. Johnson was an instructor for Curtiss before the World War. During the war he did test work, and at one time he was president of the Johnson Flying Service in Dayton, O.

Consider Building Roofed Airdrome At the Oakland Municipal Airport

SERIOUS consideration is being given to the project of erecting a roofed airdrome at the Oakland Municipal Airport, according to a recent statement from the Board of Port Commissioners, which has charge of the port. The plan under consideration provides for a structure into which the largest planes now projected can taxi to load or discharge passengers and cargo under cover.

One side of the great structure will have facilities for loading motor trucks, while the other, on the water edge of the airport, will have docking facilities for motor craft to connect the airport with San Francisco across the bay. Dredging of a channel is well under way, and as soon as it is completed the expectation is that transcontinental mail will be handled by motor boat between San Francisco and the airport instead of by train and motor truck as at present. It is said that the new channel will bring the airport within 15 min. of the present post office station at San Francisco.

The concrete foundation for Hangar No. 3 is nearly complete now, and erection of steel for the new structure will begin shortly. This will be the largest hangar built at this field, being 110 by 300 ft. Like Hangar No.'s 1 and 2 it will be of steel and corrugated iron with a clear span from wall to wall.

Installation of a new pneumatic pressure water system at the airport has been completed and the laying of pipes is now in progress.

Omaha, Neb., Air Mail Field to be Equipped Soon With Radio Station

THE OMAHA air mail field at Fort Crook will soon be equipped with its own radio station, as construction permits have been granted to the Boeing Air Transport, Inc. Nineteen landing fields in the Western States will be equipped, it is believed. Permission for construction was granted by the federal radio commission.

The company plans to keep in direct contact with its passenger, freight, and mail carrying planes over the airways connected by the fields and also has asked licenses for telephone transmitters for 25 planes.

Three wave lengths of 53.7, 71.8 and 131.8 meters length, at not exceeding 1000 watts power, will be utilized.

Stations will be located at Chicago, Iowa City, and Des Moines, Ia.; Omaha and North Platte, Neb.; Salt Lake City, Utah; Elco and Reno, Nev.; Cheyenne and Rock Springs, Wyo.; Sacramento, Oakland, Reading, Concord, Los Angeles, and Fresno, Calif.; Seattle, Wash., and Portland and Medford, Ore.

F.A.I. Awards Lieut. C. C. Champion The Altitude Record for All Types

THAT LIEUT. C. C. Champion's altitude mark of 38,418 ft. stands as the world's record for all types of aircraft was the recent decision of the Federation Aeronautique Internationale in a report to the National Aeronautic Association. Champion is a U. S. Navy flier.

Donati, famed Italian altitude flier, reached a height of 38,560 ft. in a recent flight, but this mark was not given recognition because the rules require the old height to be surpassed by 100 meters or more.

Milwaukee Airport Manager Goes With the Department of Commerce

LEONARD EBERT, manager of the Milwaukee County airport, has resigned to become an assistant airways engineer in the aeronautics branch of the Department of Commerce. He has been succeeded at the airport by Chris Setvale, his assistant for the last year.

Mr. Ebert's new duties will include the inspection of a portion of the lighting systems and the airways beacons laid along air mail routes in the middle west. His headquarters will be in Milwaukee.

Preliminary indoor tournaments in the model plane contests in Milwaukee were concluded recently under the direction of the School Board Extension Division and sponsored by the Association of Commerce. Hundreds of people watched the contests at the various social centers which eliminated all but 75 boys and one girl who will compete in the champeonship contest, the date and place of which has not yet been arranged. So successful was the indoor tournament the decision was made to hold an outdoor plane flying contest during June.

U. of Michigan Students Give Wind Tunnel Demonstration at Detroit

DEMONSTRATIONS of various aerodynamical principles were given by University of Michigan aeronautical students at the All-American Aircraft Show in Detroit. A model wind tunnel capable of producing a wind current of 30 m.p.h. designed by E. N. Fales, aeronautical engineer in charge of the large tunnel owned by the University, was shown. The model tunnel was 18 in. in diameter and its fan was driven by a ¼ hp. electric engine.

A small airfoil placed in the wind current created, demonstrated its lifting power registered by means of a gauge. The angle of attack of the wing section was changeable.

Electric power was generated by a small fan placed in the air stream, which was attached to a small generator. This current so developed lighted small searchlights similar to airport lights.

A model hangar with tiny holes in the roof attached to tubes to register air pressure when placed in the air current was shown. Another model demonstrated the amount of thrust of a tri-bladed propeller.

R. W. Miller of Ypsilanti, Mich., a graduate student in the aeronautical department, and Charles Strang of East Orange, N. J., were in charge of the University's display.

Newly Formed Baltimore Aero Club To Teach Members Flying at Cost

THE BALTIMORE Aero Club has been organized with W. F. Peck at its head. Warner S. Hull and G. L. Hein have been elected vice president and secretary respectively. The purpose of the club is to study the construction, operation and principles of the airplane, increase interest in flying in Baltimore, and to enable members of the club to learn to fly at a smaller cost than asked at a commercial school.

Negotiations are under way for the purchase of a three place plane. A vacant lot in the northwestern section of the city will be used as an airfield. The club was organized with nine members, and there have been recruits at every weekly meeting. A charter will be obtained from the American Society for Promotion of Aviation.

Detroit Show Side Lights

The Kinner 100 hp., five cylinder radial engine, manufactured by the Kinner Airplane and Motor Corp., Glendale, Calif., is the third engine to be approved by the Department of Commerce. The first was the 135 hp. Fairchild-Caminez and the second the 100 hp. Warner Scarab.

Mono Aircraft, Inc., Moline, Ill., is planning a four place cabin monoplane similar to the Monocoupe, to be powered with a larger Velie engine.

Towle Marine Aircraft Engineering Co. of Detroit is developing an amphibian flying boat that is planned to make a world cruise.

Stearman Aircraft Co., Wichita, Kan., is completing the design of an interesting closed cabin biplane with the roof of the cabin fairing into the upper wing. There is a window in the back allowing a 360 deg. range of vision in a horizontal plane. It is designed to be powered with anything up to 400 hp.

The Consent Aircraft Corp. has been formed at Buffalo, N. Y., and is designing a complete line of airplanes.

The contracts for the Army bombers will be awarded within the next week or so. The competing planes were: the Curtiss Condor, Consolidated Sikorsky Guardian, Keystone Super-Cyclops, Keystone Panther, and Fokker XLB-2.

Orin Welch is producing planes at Anderson, Ind.

The Mohawk Aircraft Corp. of Minneapolis, Minn., is bringing out a Mohawk Pinto with a very original type of closed cabin.

Bellanca Aircraft Corp., Wilmington, Del., is constructing a new Bellanca plane powered with a Pratt & Whitney Hornet engine. It differs radically from any present design.

The Cabinaire, four place biplane powered with a Warner engine and produced by the Paramount Aircraft Co., Saginaw, Mich., is starting on a tour of the country.

Pioneer Instrument Co., Brooklyn, N. Y., has developed an interesting gasoline flow meter for indicating the rate of fuel consumption.

Lenert Aircraft Co., Pentwater, Mich., is bringing out an improved model of the one exhibited at the Aircraft Show.

There were three planes exhibited using the Warner engine: the Paramount Cabinaire, the Stinson-Detroiter Junior, and the Aero-Craft Aero-Coupe.

The Dayton Airplane Engine Co. is preparing the Dayton-Bear, a 110 hp. four cylinder in line, air cooled engine for test by the Department of Commerce.

The LeBlond Aircraft Engine Co., Cincinnati, O., will shortly be in production on its 40, 60, and 90 hp. engines.

The Sikorsky Manufacturing Corp., College Point, Long Island, N. Y., has announced the completion of the first Sikorsky S-38, cabin amphibian powered with two Pratt & Whitney Wasp engines. The plane closely resembles the S-36, powered with two Wright Whirlwinds.

The Buhl Aircraft Corp., Marysville, Mich., is completing the Buhl Junior Airsedan, a closed cabin sesqui-plane powered with the Warner engine. The lower wing tapers so that it is almost triangular in shape. It is designed to carry two passengers and pilot.

At the time of this writing the Curtiss Robin is undergoing flight tests at Curtiss Field, Long Island, N. Y. It is a three place monoplane powered with a Curtiss OX-5 engine.

The "American Moth", built by the Vulcan Aircraft Co., Portsmouth, O., attracted considerable interest at the Ford Airport during the Aircraft Show.

The Comet engine produced by the Aircraft Engine Co., Oakland, Calif., is being tested in Washington, D. C., for approval by the Department of Commerce.

The Packard X, 24 cylinder water cooled engine, has been fitted with a supercharger and is said to develop 1500 hp.

The Texas Pacific Coal and Oil Co., producer of Aulu airplane engine lubricating oil, ran some interesting comparative tests on the various lubricating oils at the Aircraft Show.

The Loening Cabin Amphibian, manufactured by the Loening Aeronautical Engineering Corp., New York City, is starting on a tour of the country.

Kendall Refining Co., Bradford, Penna., had an interesting exhibit at the Hotel Statler.

Wichita, Kan., has not yet been placed on the route to be flown by the 1928 Reliability Tour but will be before the planes take off.

It is understood that the Detroit Chamber of Commerce is planning to make the All-American Aircraft Show an annual event.

Commander Byrd will use Veedol oil on his Antarctic expedition.

A number of manufacturers have already signed up for the aircraft show to be held in Chicago in December.

The Detroit Board of Commerce issued an Air Transport Survey at the time of the Show. By a carefully worked out questionnaire they gathered much valuable information as to the patronage which citizens of Detroit could be expected to give to air lines and to the air mail. The results were on the whole surprisingly hopeful, but the survey also stresses limitations of use under present conditions.

Many of those expecting to fly home from the Show were disappointed because the planes were sold and flown away by new owners.

The publishers of aeronautical magazines were present in large numbers at Detroit. They held a good-will breakfast at which the subject of raising the standards of advertising copy was discussed.

Among other things admired at Detroit was the quality of the beer.

Several firms will be able to advertise that Lindbergh sat in their planes.

Rules Are Established in England For Flying on Country's Airways

RULES FOR flying along established airways in Great Britain have been laid down by a recent amendment to that country's Air Navigation Order, according to the *Air Pilot* received in the Transportation Division of the Department of Commerce.

The new rules are said to aim at lessening the risk of collision on much-used air routes. The amendment states:

"In order to obviate the increased risk of collision which exists on air traffic routes, the following rules shall, so far as it is safe and practicable, be observed when flying on or in the vicinity of such routes:

"(a) Every aircraft when flying by compass along the straight line joining two points on an air traffic route in common use, shall keep such line at least 500 yd. on its left.

"(b) Every aircraft following an air traffic route, which has been officially recognized, shall keep such route at least 300 yd. on its left.

"(c) Every aircraft which, in the vicinity of a route frequented by aircraft, is following a line of land marks such as a road, railway, river, canal, or coastline, etc., shall keep such line of landmarks at least 300 yd. on its left.

"(d) An aircraft shall not fly keeping any of the lines or routes above referred to on its right, except at a distance therefrom sufficient to avoid aircraft following such lines or routes in accordance with these rules.

"(e) When crossing one of these lines or routes above referred to, an aircraft shall cross it at right angles as rapidly as possible and as high as reasonably practicable."

Memorial to Lafayette Escadrille Will be Dedicated in Paris July 4

AN ARCH of triumph bearing on its face the names of the dead pilots of the Lafayette Escadrille is to be formally dedicated in Paris on July 4 of this year, according to an announcement by the Conseil of the Memorial de l'Escadrille Lafayette. The central arch of the monument, now nearing completion, carries the names of the members of the Escadrille who gave their lives, and a French inscription surmounts the arch which reads "To the Memory of the Heroes of the Lafayette Escadrille Who Died in the Defense of Right and Liberty."

It is the desire of the committee in charge that ex-pilots of this famous fighting group attend the dedication this summer. The French State Department is being asked to waive the American passport fee, and the Ministere des Affaires Etrangeres has been requested to waive the visa fee and dispense with identification card requirements of those attending.

Louis Crenshaw, official in charge, may be addressed at 83 Rue Perronet, Neuilly-sur-Seine, France. Crenshaw is now negotiating for reduced steamer and railway fares for the Escadrille members and their families.

Three Germans Come to America To Give Glider Flight Exhibitions

ROEHRE, HESSELBACH, and Dahlmann, three members of the Rhoen-Rossitten Society, a German glider organization, have arrived in America from Bremerhaven to give flight exhibitions with their glider "Darmstadt", which last year scored several new records in the Rhoen competition. The Germans have come at the invitation of an American engineless aviation club.

Lieut. N. A. Goddard Heads Flying School on Campus at Stanford U.

A SCHOOL of aviation is now being operated on the campus of Stanford University, Berkeley, Calif., 70 acres having been leased by the University in the southeast corner of the Farm, bordering the state highway to San Francisco, to Lieut. Norman A. Goddard, U.S.N.R., who is conducting the training school. A course in flying is thus open to Stanford students who are doing work in the Daniel Guggenheim

Training planes lined up on Lieutenant Goddard's flying field

Aeronautic Laboratory connected with Stanford's school of engineering. The airport, furthermore, offers a field for the neighboring town of Palo Alto.

On the northeast corner of the field is an administration building with offices and classroom accommodations for 50 students, a steel hangar sufficiently roomy for eight planes with construction classroom included, a repair shop, and janitors' quarters. The hangar is equipped with wind cone and marked on the roof with the school name, lights for night landings are to be installed, and three runways are now being used, 2,900 ft., 2,400 ft., and 1,500 ft. in length, respectively.

The school is exclusive representative for Waco and Fairchild planes in Santa Clara and Santa Cruz counties. Gilbert C. Wheat being sales manager. Lieutenant Goddard has chosen the Waco 10 for training purposes and has two in constant operation with a third shortly to be added for graduate students who desire to obtain flying time for the higher licenses. Goddard's monoplane "Gypsy", his Dole machine entry, is also at the field, having been rebuilt.

Lieutenant Goddard, who is in charge of the school, received flying training in the Royal Naval Air Service in 1914 and did submarine scouting work over the North Sea. Detached from active duty after having been shot down by enemy planes and drifting at sea for 72 hr., Goddard acted as instructor in the Canadian Air Force until the close of the war, graduating as Aero Engineer in this service. He later moved to California and is now senior lieutenant in the U. S. Naval Reserve with 3300 hr. flying to his credit.

Newly Formed Albany Air Service In Operation at Westerlo Island

FORMED TO operate a complete flying service, including long distance trips, instruction, aerial photography, and advertising, the Albany Air Service, Inc., was recently opened at Westerlo Island Field, near Albany, N. Y. Gasoline, oil, and telephone service has already been installed at the field and a hangar and office will shortly be erected.

George E. Walker is president of the company, while Oliver E. Townsend is vice president and chief pilot, and R. Harry Porter is field and operations manager.

Two New Airport Lighting Units Announced by General Electric Co.

TWO NEW lighting units for airport use have been developed by the General Electric Co., one being an intermediate field boundary light and the other an airport ceiling light.

The intermediate unit is recommended for use on a multiple circuit at small airports where the number of lamps around the entire field will not exceed 30. For such installations the manufacturers recommend the use of the light with 2 conductor, No. 10 parkway cable laid in two separate circuits to a point half-way around the field. The units are equipped with clear, ruby, or green globes. Clear globes are used to indicate the boundaries, and ruby globes are used to mark obstructions, while the most favorable approaches to the field are indicated by green globes. The light may be used with 25, 40, 50, or 60 watt lamps.

Used to Determine Cloud Height

The ceiling light is used at airports to determine the approximate height of fog or clouds above the ground, so that this information can be transmitted along the airway for the benefit of the approaching pilot. It is equipped with a non-corrodible, aluminum alloy drum, attached to the side of which is a pad for setting the beam of the searchlight at 45 deg. instead of horizontally. As this light need not be changed after the initial setting, a permanent method of mounting is provided.

New York-Atlanta Air Mail Line To be Opened by Pitcairn May 1

SERVICE OVER the New York to Atlanta air mail route is to be inaugurated May 1, Geoffrey S. Childs, general manager of Pitcairn Aviation, Inc., of Philadelphia has announced. Under tentative schedules, planes will leave New York and Atlanta in the evening and arrive at Atlanta and New York, respectively, in the early morning, a run of about nine hours. Stops will be made at Philadelphia, Washington, Greensboro, N. C., and Spartanburg, S. C.

Pitcairn Mailwing planes are to be used over the route. These airplanes have been especially designed for mail flying, passenger seats being omitted and a large fireproof and rainproof mail compartment substituted with a mail capacity of 350 lb. Cruising speed of this type plane is better than 100 m.p.h. and the high speed is over 130 m.p.h.

Holeker Manufacturing Co. Opens Department to Make Plane Parts

AN AIRPLANE department for the manufacture of parts has been opened by the Holeker Manufacturing Co. of Kansas City, Mo., according to a recent announcement. This company has built coach bodies for more than 40 yr.

Utilizing skilled labor essential to this work, the company is now open to orders for special cowl work and aluminum and gasoline tanks. Aluminum gas tanks have been made by the concern for more than a year, a number of them now being used by the National Air Transport Co. with over 800 hr. of flying time. The plant has a floor space of better than 80,000 sq. ft., and the large machinery used in body work is said to enable the manufacture of parts for the airplane trade at a great saving.

Oklahoma Airlines, Inc., of Tulsa To Offer Service in Many Cities

A CORPORATION which recently formed in Tulsa, Okla., the Oklahoma Airlines, Inc., to act as airplane agent, operate schools and offer other aeronautical services in some 12 different cities. The No. 1 airport, located at Tulsa, is of 180 acres in extent, and the company is considering adding an additional 100 acres.

An 81 ft. beacon tower has already been erected at this field, which has two natural runways, and hangars are to be built shortly. Teams and tractors are now at work grading, sodding the ground, and building cement driveways. Besides 18 steel hangars ranging in size from 40 x 40 to 60 x 120, a machine shop and repair service building is planned. A clubhouse will combine administration offices and quarters for 80 men and will be 50 x 150 in size with a veranda.

Elmira Flying Service is Formed To Give Instruction to Members

THE ELMIRA Flying Service, Inc., was recently formed at Elmira, N. Y., with a membership of eight. The company was organized for the purpose of promoting interest in flying and for giving instruction to members.

A Curtiss Oriole plane, purchased a short time ago from the Wilson Aerial Service at Rochester, N. Y., is now in use and is kept at the Elmira Airport hangar. William F. O'Brien of Elmira is head of the enterprise.

The Detroit S.A.E. Meeting

Continued from page 1212

Warner pointed out the great value of this work and reiterated the fact that it was much easier to standardize on a few sizes before an industry had progressed too far.

Although the object of the meeting was to bring the work already done by the sub-committees before the commercial manufacturers of planes, engines and accessories for discussion few of those interested were represented. Three commercial aircraft engine manufacturers had engineers present and several accessory men were there, but engineers of active commercial aircraft factories were conspicuous by their absence.

The first subject for discussion was the adoption of standards for bolts, nuts, shackles, turnbuckles, etc. On all these objects the Army and Navy have established pretty definite standards and on the whole it was the opinion of the sub-committee that these were suitable for commercial use. The point was made that the size of the parts was often not as important as the strength of the material and it was proposed that parts of high tensile strength should be marked in a special way. Further discussion of this was put off until a later date. On the question of wheels and rims there seemed to be a rather divided opinion, the tire, brake and wheel people feeling that there were already enough standard sizes, while the few aircraft operators who were present felt that the number might be increased. A standard of tail skid shoe mounting was proposed, but it was felt that the trend of design was not sufficiently definite to permit of standardization. In the matter of instruments, Archibald Black, who was chairman of the sub-committee, proposed that the dial of instruments be standardized in a size somewhat smaller than those at present used. As many were doubtful as to the practicability of smaller dials the matter was postponed for further discussion.

The standardization of engine mounts brought forward a considerable amount of discussion and it was pointed out that it was very difficult to design an engine around an engine mount and that it would probably be more practical to design special mounts for each engine which could be detached from the fuselage. Four standards for propeller hubs were adopted, each for a different powered engine. The standard does not follow any logical rules but copies established practice in various types of engines. The Army and Navy standard of starter mount was adopted but it was also suggested that a smaller mount might be necessary in commercial engines.

Many interesting points were brought out during the various discussions and it was unfortunate that more commercial manufacturers were not able to attend this important meeting.

The All-American Aircraft Show in Retrospect

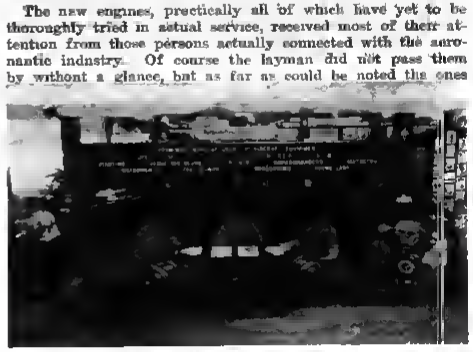
Continued from page 1207

gether in one section while the rest were located in various places about the Hall.

Most of the well known engines were exhibited in cutaway form and operated by an electric motor. They of course attracted attention as it was a splendid opportunity for the layman to view the "mysterious" workings of famous engines, the names of which have almost become household words.

The new engines, practically all of which have yet to be thoroughly tried in actual service, received most of their attention from those persons actually connected with the aeronautic industry. Of course the layman did not pass them by without a glance, but as far as could be noted the ones who stopped and made close examinations were those who know that the industry is in need of a reliable and proven low horsepower engine that can take the place of the well known OX-5. And, incidentally, it was interesting to note that with the exception of war surplus power plants all of the engines installed in the planes on exhibition were air cooled.

The accessory exhibits were particularly interesting, the



Picture of the attractive and well laid out exhibit of Norma-Hoffmann Bearings Corp.

cause of the fact that the application and uses of the various products were clearly portrayed. Actual working demonstration was given in practically every case, and it was quite evident that these exhibitors had devoted considerable time and thought in preparing their respective displays. As a matter of fact some of them were of sufficient interest and

Side view of an OX-5 Travel Air biplane equipped with pontoons

attractiveness to have received a much better location in the Hall than they did receive. However it is impossible to please everyone and those in charge of the Detroit Show are to be complimented on their arrangement of the exhibits, when one considers the existing conditions with which they had to contend. With the experience gained by the holding of the Detroit Show it is quite probable that the matter of locating exhibits will be given more attention in the future.

The manner in which the Show was conducted was most satisfactory, and the Detroit Board of Trade and the Aeronautical Chamber of Commerce are to be congratulated on the splendid results of their sincere efforts. Ray Cooper, manager of the Show, is particularly deserving of praise. It was indeed unfortunate that illness confined him to his home the first few days. His appearance in the middle of the week was enthusiastically welcomed by all who know him.

Apart from the opportunity for the industry and the public to inspect the very latest developments in commercial aero-

The exhibit of the Pioneer Instrument Co. At the left can be seen an earth inductor compass mounted on a pedestal.

nautics one of the greatest benefits afforded by the Detroit affair was the chance for the members of the industry to make new acquaintances. It proved to be an ideal time for the holding of various conferences, for almost every one of importance in the industry visited the Show at some time during the week. It would have been of great assistance had some sort of booklet been published listing the names of out-of-towners and the hotels at which they were stopping. Undoubtedly this will be done the next time.

In summary, the All-American Aircraft Show was a great success and a credit to the industry. It marked the beginning of a new era in the history of American commercial aeronautics. It was the first of its kind in this country, if not in the whole world, and the value of the experience gained in the holding of commercial aircraft shows is inestimable. Whether or not the 1929 show will be held in Detroit is something to be decided when the smoke clears away. At any rate Detroit has established a meritorious precedent that other cities will find difficult to surpass.

The Packard Motor Car Co. exhibit. The engine in the middle is a 24 cylinder Packard X engine.

The Halpin "Flamingo"

Continued from page 1211

drag load. The inner bay, on each side of the fuselage, is taken up by a terneplate gasoline tank of 75 gal. capacity. To facilitate quick filling of the tanks, in service, they are fitted with 3½ in. diameter filler necks which permit filling without the use of a funnel. The tanks are in line with the center of gravity so that their contents does not affect the

Showing wing construction. Both ribs and spars are made of duralumen.

balance of the plane. The wings are pin jointed to the sides of the fuselage utilizing the depth of the wing to increase the head room in the cabin.

Unlike the wing, the fuselage is braced internally by closed section, seamless, steel, tubing welded into a truss similar to that used in a fabric covered design. The metal skin is fastened to light duralumin channels riveted to clips placed on the tubes. The cabin is unobstructed by any bracing; it is 10 ft. long, 5 ft. high and 3 ft. 8 in. wide, with a volume of 195 cu. ft. At the left of the pilot's compartment is a door

while the entrance to the passenger compartment is through a full size door on the right. Running the length of the cabin, on both sides, are glass windows 14 in high. The glass in the cabin is ¼ in plate with edges ground and polished, while the glass around the cockpit is non-shatterable. The windows are mounted in aluminum frames which are contrasted, in the interior, with gray duo-tone fiber board trimmed with steel. The ceiling is fitted with dome lights above the passenger seats. These seats are upholstered reed chairs secured to the floor. Behind the passenger cabin is a compartment with a 40 cu ft baggage hold, toilet and wash room facilities. In front of the passenger cabin is the pilot's compartment with two side-by-side seats fitted with dual wheel control.

Pioneer Instruments Used

Cables are used throughout the control system. The control wheels are fitted with sprockets and chains which are attached to the cables. The cables run over Micarta pulleys to control horizontal surfaces. The rudder pedals are of the stirrup type while the wheel brakes are operated individually by a lever mounted in the center of the cockpit. Pioneer instruments and recessed navigating lights are mounted on the wing and tail in accordance with the Department of Commerce specifications. Provision is also made for landing lights which will be streamlined into the wing tips.

The control surfaces are of high aspect ratio and nearly rectangular in shape. The ailerons are of the unbalanced type set in one foot from the wing tips. They are differentially controlled. The horizontal stabilizer is adjusted by a screw mechanism controlled from the cockpit and is self-locking in any position. The vertical fin is adjustable on the ground. All of the control surfaces are constructed of duralumin channels covered with .014 in. corrugated sheet duralumin. The fixed surfaces are externally braced and the movable surfaces are mounted on self-aligning ball bearings.

The landing gear is of the divided axle type with the members braced to the wing support struts and to the fuselage longerons. The landing gear rotates about the lower longer-

Showing the Aerol Shock Absorber landing gear. The brakes are operated by a lever which will attach wheels separately or together

on to which it is attached at two points. The shock absorbing member is vertical, attached to the wing brace which, in turn, is supported from the upper fuselage longeron. The shock absorber is an Aerol strut unit. The members of the undercarriage are of heat-treated chrome molybdenum steel tubing faired with sheet duralumin. The wheels are 30 in. by 5 in. Sauzedde wheels fitted with brakes that operate either separately or together. The usual tail skid has been replaced by a small steel wheel faired with aluminum and fitted with a 3½ in. flat steel tire. The wheel is mounted so that it may swivel, enabling the plane, by means of the brakes, to turn with a very small radius. The stern post acts as an emergency tail skid.

Standard on these planes is the Pratt & Whitney Wasp engine rated at 400 hp. at 1900 r.p.m. It is fitted with a 10 ft. diameter Standard Steel adjustable pitch propeller. The engine is cowled with .050 in. aluminum sheet with louvres at the sides to provide ventilation. Those at the front

Showing the "Wasp" engine installation, fire wall and 14 gal oil tank

may be opened or closed to regulate the temperature of the engine. Set into the cowling so as not to interfere with the streamlining, is the exhaust manifold ring. It is fitted with a heater at the bottom that is connected to both the cockpit and the passenger cabin. An Eclipse hand inertia starter is provided. It is fitted with a special ratchet device for starting the engine from the pilot's cockpit. Mounted just forward of the fire wall is a 14 gal. oil tank. This tank is intended to hold 12 gal. of oil. The fire wall is of .032 in. terneplate riveted and soldered to the tubing of the engine mount.

The manufacturer's specifications on the Flamingo are as follows:

Length overall	30 ft
Height overall	9 ft.
Span overall	48 ft.
Chord	8 ft
Wing area	354 sq. ft.
Cabin capacity	195 cu ft
Tread of landing gear	10 ft
Weight empty	2,784 lb
Load	8 people and 600 lb baggage
Useful load	2,050 lb
Total load	4,834 lb
High speed	140 m.p.h.
Cruising speed	118 m.p.h
Landing speed	48 m.p.h
Climb	1,375 f/p.m.
Service ceiling	18,000 ft
Cruising radius	8½ hr or 1,000 mi
Gasoline consumption	18 gal. per hr
Oil consumption	½ gal. per hr
Gasoline capacity	150 gal
Oil capacity	12 gal.

The construction of the Flamingo is the result of the efforts of Thomas E Halpin who promoted and organized the company The design was worked out by Mr. Halpin together with Ralph R. Graichen and Walter C. Clayton Mr Halpin was formerly assistant to the general manager of the Stout Metal Airplane Co., division of the Ford Motor Co., and was later a pilot with the Stout Air Services. Mr. Graichen was an engineer with the original Stout Metal Airplane Co. and later in charge of control car design for the Aircraft Development Corp of Detroit, Mich. He is now chief engineer for the Halpin Development Co Mr. Clayton was formerly with the Boeing Airplane Co. and later with Ford and then Fokker. He is now engineer in charge of production with the new company The shop superintendent is Frank Hardman, who is assisted by John A. Knoob, with Orrie Fryman, Martin Chappelle and William Chewen as foremen.

Wing Stress Analysis

Continued from page 1210

Beam Loading

It will be noted from the General Data that the overhang is 120 inches and the chord only 84 inches. The overhang is then materially more than the chord. In the previous chapter it was stated that in this case the loading in Fig. 51 would have to be used for loads inboard of the outer inflection point, and the loading of Fig. 52 for the loads and design of members outboard of this inflection point. That is, the spar at the strut point and the lift or wing struts will be designed by the loading of Fig. 52. For convenience of reference let us call the loadings as follows:

Case A—the loading as shown in Fig. 52.
Case B—the loading as shown in Fig 51.

It will be necessary for us to analyze the wing almost completely for both cases. In each case the wing will have different effective spans, beam loads, shears, and moments. The two cases will be carried along parallel as far as possible and then Case A will be continued until the wing struts are designed Then Case B will be carried through until the drag truss is designed. In the next Chapter the spars will be investigated and designed by each case as it applies

Loads on Wings.

1—Gross weight = 2210 lb.
2—Effective Span (Effective semi-span S_e is found)
Case A— (120 + 126) — 0.1 × 84 = 237.6 in
Case B— (120 + 126) — 0.25 × 126 = 214.5 in.
For this type of plane the effective span is merely the actual span of the wing minus a length specified in Figs. 52 and 51 to allow for tip loss. For Case A this length is 0.1 times the chord, and for Case B it is 0.25 times the overhang.
3—Dead weight of wings = 355 lb. $w_d = 355/(120 + 126)2$ = .72 lb. per in. run.
4—This is a monoplane—no efficiency corrections.
5—Normal Gross Beam load:
Case A— $w_g = 2210/237.6 \times 2 = 4.65$ lb. per in. run.
Case B— $w_g = 2210/214.5 \times 2 = 5.15$ lb. per in. run.
6—Normal Net Beam load:
Case A = 4.65 — .72 = 3.93 lb. per in. run. = w
Case B = 5.15 — .72 = 4.43 lb. per in. run. = w
Check on work:
Case A— 2(3.93 × 237.6) + 355 = 2219 lb.
2219 lb. equals 2210 lb approximately.
Case B— 2(4.43 × 214.5) + 355 = 2255 lb.
2255 lb. equals 2210 lb. approximately

The loading of Case B (Fig. 51) depends upon the overhang of the wing which varies with each plane. 2255 lb. is considerably more than 2210 lb, but is alright as it loads the wing more severly and is thus on the safe side. A difference of 45 lb in 2200 is not too great.

7—Normal Chord Loads: (Case B only is used for chord loads)

Table of Design Chord Loads.

Flight Condition	Beam Load per inch run	Chord/Beam ratio	Chord Load per inch run	Load Factor	Design Chord Load
H l.	4.43	—0.144	—0 64	6.9	—4 42
L.l.	4 43	0.15		4.5	
I F.	4.43	0			
Dive*			3.77	1	3.77

*The net weight of the plane 1855 lb. is distributed uniformly along the beam. No load factor is required.

Chord load in Dive = 1855/(120 + 126)2 = 3.77 lb. per in. run

Distribution of Loads between Spars.

Case A and B:— H.I and I.F.
Front spar takes 65 — 31/65 — 15 = 68%
Rear spar takes 31 — 15/65 — 15 = 32%
L.I.
Front spar takes 60 — 51/65 — 15 = 28%
Rear spar takes 31 — 15/65 — 15 = 72%

Beam Loads per inch run on Spars.

Flight Condition	Case	Spar	Net Load per in. on Wing	Load Factor	% carried by Spar	Net Load per in. run
H I	A	Front	3.93	6.9	68	18.45
		Rear	3.93	6 9	32	8.7
	B	Front	4.43	6.9	68	20.8
		Rear	4.43	6 9	32	8.8
L.l	A	Front	3 93	4.5		
		Rear	3 93	4.5		
	B	Front	4.43	4.5		
		Rear	4.43	4.5		
1 F	A	Front	3.93	2 76	68	—7.38
		Rear	3.93	2 76	32	—3.47
	B	Front	4.43	2.76		
		Rear	4.43	2.76		

The net load per inch run on each spar is found by multiplying the net load per inch on the wing by the load factor and the percentage carried by the spar.

Computations of Moments, Shears, and Reactions.

The next step in the analysis is the computation of moments, shears and reactions on each spar under each net load per inch run as listed in the above table The simplest way

Fig. 56 - Case A

of doing this is to calculate these quantities for both Case A and B by placing a unit load on the spar and to increase the results obtained in direct proportion to the actual net loads per inch run on the spar for each condition.

Case A (Fig. 56)—Unit Spar Loading

$$M_1 = 42 \times 1 \times 21 + 84 \times .8 \times (42 + 42) + \frac{84 \times (1 - .8)}{2}(42 + \frac{84}{3})$$

M_1 = 882 + 5550 + 616 = 7148 inch lb.
M_2 = zero (pin-jointed)

$$S_1 = 84 \times \frac{.8 + 1}{2} + 42 \times 1 = 117.6 \text{ lb.}$$

$S_2 = -7148/120 - 120 \times \frac{1}{2} = -119.6$ lb.

R_2 = 237.2 lb.

$S_{-3} = 120 \times \frac{1}{2} - 7148/120 = 0.4$ lb $= R_4$ (since $S_{+3} = 0$ due to pin-joint)

Check: $R_1 + R_4 = 237.2 + 0.4 = 237.6 = 117.6 + 120 \times 1 = 237.6$

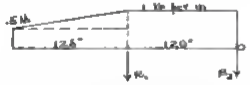


Fig. 57 - Case B

Case B (Fig. 57)—Unit Spar Loading

$$M_1 = \frac{126' \times .5}{2} + \frac{126' \times .5}{2 \times 3} = 5293 \text{ inch lb}$$

M_2 = zero (pin-jointed)

$$S_{-1} = 126 \times \frac{1 + .5}{2} = 94.5 \text{ lb}$$

$S_{+1} = -5293/120 - 120 \times \frac{1}{2} = -104.1$

$R_1 = 198.6$ lb

$S_{-3} = 120 \times \frac{1}{2} - 5293/120 = 15.9$ lb $= R_4$

Check: $R_1 + R_4 = 198.6 + 15.9 = 214.5 = 94.5 + 120 \times 1 = 214.5$ lb

Bending Moments and Reactions on Spars.

M_1 under 1 lb. per inch load is obtained for each case from the solution of the beam for moments, shears, and reactions made just above (Figs. 56 and 57). The net load per inch run for each flight condition is taken from the table "Beam Loads per inch run on Spars". Multiplying the unit M_1 by the load per inch on the spar will give the actual moment on each spar for each condition.

The actual R_4 is obtained in the same manner

Moments.

Case	Spar	M_1 under 1 lb./in	H. I. Load per in	H. I. M_1	L. I. Load per in	L. I. M_1	I. F. Load per in	I. F. M_1
A	Front	7148	18.45	132,600				
	Rear	7148	8.7	62,100				
B	Front	5293	20.8	110,000				
	Rear	5293	9.8	51,800				

Reactions

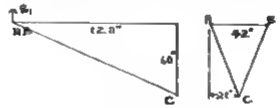
Case	Spar	R_1 under 1 lb./in	H. I. Load per in	H. I. R_1	L. I. Load per in	L. I. R_1	I. F. Load per in	I. F. R_1
A	Front	237.2	18.45	4380			—7.38	—1750
	Rear	237.2	8.7	2062			—3.47	—824
B	Front	198.6	20.8	4130				
	Rear	198.6	9.8	1947				

It is to be noted that the inverted flight loads are negative since they are acting down. The inverted flight loads were found for Case A only, because these loads design the wing struts and it is desired to show how this is done. Inverted flight loads put compression in the wing struts and as these struts are very long, this condition is usually the design condition.

Lengths and Components of Wing Struts.

Member	V	H	D	V^2	H^2	$D^2 = V^2 + H^2 + D^2$	I
Front Strut (AC)	60	120	21	3600	14,400	441	18,441	135.8"
Rear Strut (BC)	60	120	21	3600	14,400	441	18,441	135.8"

At the points of attachment of the wing struts to the wing (A and B) there are reactions R_3 pulling up in high and low incidence and pushing down in inverted flight. This reaction puts the wing struts in tension when pulling up and in compression when pushing down. The loads in the struts may be obtained by multiplying the reaction by the length of the strut divided by the V component, both of which may be obtained from the table above. The loads in the wing struts have a horizontal component which imposes an axial load on the spar. The amount of this axial load may be obtained by multiplying the load in the strut by its horizontal component divided by its length. That is, by H/L as obtained from the table above. Also, in this particular plane, the struts are not



Wing Truss

Fig. 58.

parallel to the spars and so they impose drag and anti-drag loads on the wing. These loads are obtained by multiplying the load in the strut by D/L as obtained from the table above. Loads acting forward on the wing are anti-drag loads and are given a negative sign.

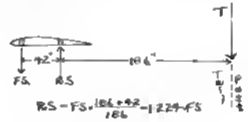
The table directly following is filled in for the high incidence loads and the inverted flight loads for Case A. The wing struts must be designed by Case A and invariably it will be found that the inverted flight condition will be the design condition as in this case the wing struts are in compression.

Loads in Wing Struts—Spar and Drag Loads

Case	Truss	Loading Condition	Reaction R_1	Load in Strut $R_1 \times L/V$	Axial Spar Load Load in Strut X H/L	Drag Loads* Load in Strut X D/L
A	Front	H. I.	4380	9900T	8760C	——
		L.I.				
		I.F.	—1750	3950C	3500T	——
	Rear	H.I.	2062	4650T	4124C	——
		L.I.				
		I.F.	—824	1860C	1648T	——
B	Front	H.I.	4130	9330T	8260C	+1455
		L.I.				
		I.F.				
	Rear	H.I.	1947	4400T	3894C	—670
		L.I.				
		I.F.				

*Drag truss is designed by Case B only.

As stated before, in high and low incidence the reaction R_1 always acts up and the wing struts must pull down thus being in tension. As they pull down they also pull inward toward the fuselage thus putting a compressive axial load in the spars. In inverted flight, the reaction R_1 is down, the



Nose-Dive Condition
Fig. 59

wing struts are in compression, and they push outward from the fuselage thus putting a tensile axial load in the spars. When the wing struts are in tension the front strut pulls back putting a drag load on the wing and the rear strut pulls forward imposing an anti-drag or forward load on the wing. This then explains the character of the stresses and the signs used in the table.

Nose-Dive Condition

As may be seen from Fig. 59, in the nose dive condition, the loads on the rear spar (RS) are 1.224 times the loads on

the front spar (FS) and act upward. For equilibrium it is evident that the rear spar loads must equal the front spar loads plus the load on the tail (T). The loads on the front spar are taken as the final design loads on that spar for the inverted flight condition. The following table may be filled in to find all the necessary loads in the nose dive condition:

		I F. & N D. Front Spar	N.D. Rear Spar
			= —1 224FS
Case A	Load per in. run	—738	+9 05
	M_1		
	R_1	—1750	2142
	R_2		
Case B	Load per in. run		
	M_1		
	R_1		
	R_2		

The wing strut, spar and drag loads are found in the same manner as for the other three conditions

Case	Loading Condition	Truss	Reaction R_1	Axial Spar Load: Load in Strut $R_1 \times L/V$	Axial Spar Load: Load in Strut X H/L	Drag Loads Load in Strut X D/L
A	Dive	Front	—1750	3950C		
	Dive	Rear	2140	4840T		
B	Dive	Front				
	Dive	Rear				

Design of Wing Struts.

The wing struts must be designed by Case A in accordance with the requirements of the Handbook. Referring to the tables "Loads on Wing Struts" we find the maximum loads to be:

Front strut Max. Compression — 3950 lb. — I F. and N.D.
Max. Tension — 9900 lb — H.I.

Rear strut: Max. Compression — 1865 lb — I F
Max. Tension — 4840 lb. — N.D. (perhaps L.I. will have greater load when table is filled in.)

These struts are so tremendously long that they are invariably weakest under a compression load and must be designed as long columns by the Euler formula:— $P = \pi^2 EI/L^2$.

We will assume the struts of this plane to be mild carbon steel (1025) with a value of E = 28,000,000. They are round tubes streamlined with spruce and are pinned at both ends thus having a restraint coefficient of unity (c = 1).

Design of front strut. We know all the quantities in the formula but the value of I. Solving for that:

$I = PL^2/c\pi^2E = 3950 \times 135.8^2/1 \times 3.14^2 \times 28{,}000{,}000 = .263$ in.⁴ Referring now to Table 4 of Chapter 5 we find that a 2¼-.065 tube has an I value of .2665 in.⁴. This is evidently a little more than we need and therefore this tube will do. Its margin of safety is .2665/.263 — 1 = .012 We must make a check to see if our tube will carry the maximum tension load. Referring to Table 5 of Chapter 5 the area of a 2¼-.065 tube is 0.4462 square inches. The strength of mild carbon steel is 55,000 lb. per sq. in. Thus the tube strength in tension is 55,000 × 0.4462 = 24,600 lb. As our tension load is only 9900 lb the tube is well over strength in tension.

Design of the rear strut

$1 = PL^2/c\pi^2E = 1850 \times 135.8^2/1 \times 3.14^2 \times 28{,}000{,}000 = .124$ in.⁴

Referring to Table 4 again: a 2-.049 tube has I = .14299 in.⁴
2¼-.035 tube has I = .14940 in.⁴

Either tube is strong enough but it is probably preferable to choose the 2¼-.035 as it is lighter and has the same diameter as the front strut. Its margin of safety is 1494/.124 — 1 = .205 Its tensile strength is 55,000 × 0.2436 = 13,400 lb. which is well in excess of the 4840 lb. required by the nose diving condition

Loads in Drag Truss.

The drag truss is solved for the loads of Case B only. The loads on the drag truss are made up of two parts, first the chord loads distributed uniformly along the entire span of the wing, and second the drag and anti-drag loads due to the drag component of the lift struts. This latter load is a concentrated load at the point of attachment of the wing strut to the wing. The distributed chord loads are considered concentrated at the panel points. Wherever a compression strut is located is a panel point. The load on half the panel to either side of a panel point is considered concentrated at the panel point. At the extreme outer panel point the wing tip is considered the center of the panel. The drag truss will be solved for the high incidence condition to illustrate the method. The solution of the truss for low incidence and diving is the same excepting that the distributed loads act back in these two conditions and not forward as in high incidence. The drag truss must also be investigated for inverted flight but in this condition there is no distributed load—only the concentrated loads due to the wing struts.

Fig 60 illustrates the solution of the drag truss for the high incidence condition. This is done by the simple analyti-

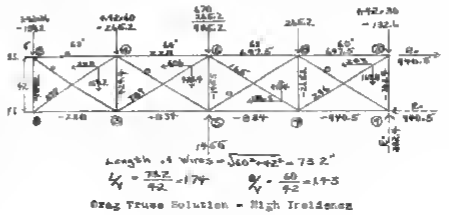


Fig 60

cal method of balancing all vertical and horizontal forces at each panel point. This method was explained in detail in Chapter 1.

The distributed chord load is taken from the table of paragraph 7 of this chapter under the design chord load for high incidence. The concentrated loads at the strut points are obtained from the table "Loads in Wing Struts"

Explanation of Drag Truss Solution.

When the loads on the drag truss have been properly placed in the correct panel points the solution of the truss may be begun. Starting at panel point 2 the load of 159.2 lb. must pass directly into number 1-2 since the other members at this point are 2-3 which is a wire and cannot take compression, and 2-4 which is at right angles to the load and consequently cannot take it.

Now referring to panel point 1 we have a load of 159.2 lb pushing down. The wire 1-4 must pull up to maintain equilibrium in the vertical plane. The necessary load in the wire to do this is 159.2 × L/V which is 159.2 × 1.74 = 277 lb. This 277 lb. tension in the wire exerts a horizontal force at panel point 1. This horizontal component of the wire must be taken up by spar member 1-3 pushing outward. The amount of force necessary in the spar may be found by 159.2 × H/V which is 159.2 × 1.43 = —228 lb. The minus sign indicates compression.

Let us now move to panel point 4. In addition to the horizontal force of 228 lb and the vertical force of 159.2 lb. exerted by wire member 1-4, we have a vertical panel load of 265.2 lb. Wire 4-5 is slack due to the vertical load of 159.2 + 265.2 = 424.4 lb acting down. This vertical load goes directly into the compression strut 3-4. The horizontal

component of the wire, 228 lb., is taken by tension in spar member 4-6

At panel point 3 we have a repetition of panel point 1 The vertical load of 424 4 lb. is taken by wire 3-6 The load in the wire is 424 4 × 1 74 = 739 lb The horizontal component due to the wire is 424 4 × 1 43 = 606 lb This 606 lb is taken in compression by spar member 3-5. But this member must also resist a compression force of 228 lb. being transmitted by spar member 1-3 Thus the total compression in member 3-5 is —606 plus —228 = —834 lb.

At panel point 5 the vertical load is transmitted directly to compression strut 5-8 putting 1455 lb. compression in this member Both wires coming to point 5 are slack and so have zero load. The horizontal compression load of 834 lb passes by the point into spar member 5 7 without changing.

At panel point 8 the resultant vertical load is 95 4 lb upward This is taken by wire 6-7 with 165 lb tension A horizontal tension of 606 plus 228 = 834 lb is exerted by members to the left of the panel point Wire 6-7 exerts a horizontal tension to the right of 136 5 lb The difference between these tensions 834 — 136 5 = 697.5 lb must be taken in tension by spar member 6-8

Panel points 7 and 8 may be solved in similar fashion The reactions at the end of the truss (indicated by dotted lines) are the forces which the fuselage must exert on the wing to maintain equilibrium

Drag Truss—Summary of Loads and Design of Members

Member	H I	L I	Dive I F	Des. Load	Material and Size of Member	Strength M S
Drag Wires						
2-3	0					
4-5	0					
6-7	165					
8-9	0					
Anti Drag Wires						
1-4	377					
3 6	739					
5 8	0					
7 10	298					
Compression Struts						
1 2	—152 2					
2-4	—424 4					
3-5	—145 5					
4 6	—265 2					
9 10	—302 4					
Front Spar						
5 7	—834					
7 9	—040 5					
Rear Spar						
6-8	697 5					
8 10	697 5					

— indicates compression + indicates tension

In tabulating the above table the maximum load in each member is the design load for that member For the drag and anti-drag wires round or square tie rods should be used. The required size and strength of these may be obtained from Table 10 of Chapter 6. If double drag wiring is used each wire must be able to take 65% of the total design load for the both of them. For the ordinary wing consisting of spruce I or box spars with plywood or built up ribs, the compression struts should be of spruce The method of figuring these struts is given in the paragraph on Spruce Columns in Chapter 4 Fig 41 of Chapter 4 gives the allowable load. The loads in the spars inboard of the wing struts were listed as they will enter into the calculations of the loads in the spars by the Precise Method

In the next chapter the wing spars will be designed and the stresses in them investigated by applying the Precise Equations. This will complete the design of the wing and then we will go on to chassis and fuselage analysis.

To be continued in the next issue of AVIATION

A Designer's Impressions of the Detroit Show

Continued from page 1209

Excellent as appeared to be the performance of 200 hp cabin airplanes, it does not seem to satisfy pilots any more. They carry sufficient load, at what we now call fair speed, but their take-off is comparatively slow and their climb appears to pilots to be sluggish. Also the high speed of 120 m.p.h. appears to be only fair. This performance seemed to be excellent only a year ago, but the craving for still greater speed and for snappier climb seems to be insatiable. This is

The Taylor "Chummy" monoplane powered with a 90 hp Ryan-Siemens engine.

not surprising. We demand 8 cylinder, 80 hp. engines for automobiles just to save the trouble of shifting gears. So much more we are justified in demanding plenty of power in an airplane, as nothing contributes as much to its safety as quick take-off and rapid climb. And there is the question of preserving the engines by throttling in flight. It has been shown that ceiling of an airplane is proportional to the coefficient

$$K = W/P\sqrt{W/A}$$

where W is weight in pounds

A — Wing area

P — Horsepower

When this coefficient reaches the value of 105, the ceiling is at sea level, i.e. the airplane is barely able to sustain itself in the air, at ground level. The smaller that this coefficient is the higher the airplane can climb, i.e. the more reserve power it has. Now, for 200 hp. monoplanes weighing between 3500 and 3900 lb. the coefficient is found to be in the neighborhood of 60, showing a fairly low ceiling and inability to throttle the engine very much. It is certainly a credit for the Wright Whirlwind that it stands up so well under these conditions.

Front quarter view of the "Monocoupe" powered with the new Velie 70 hp. engine

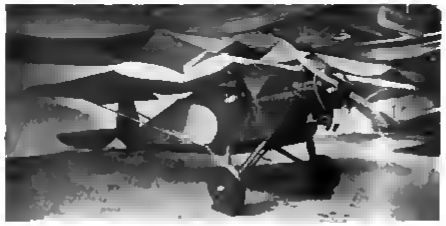
The craving for higher speed, quicker take-off and climb,

Richard Walling, popular screen star and aviation fan wearing a Scully Helmet.

and for larger reserve of power resulted in the production of airplanes of about the same type as the one described above, but equipped with Wasp engines of 425 hp. The carrying capacity was increased only very little—from 5 or 6 to 6 or 8 passengers, and total weight of loaded airplane was increased to 4700 or 5000 lb., while the horsepower was doubled. This resulted in a decrease of the coefficient K to about 45, showing a much higher reserve of power. Three airplanes of this type were exhibited at the Show—the Fokker "Super-Universal", the Halpin "Flamingo", and the Hamilton "Silver Streak". The manufacturers claim for their performance 135 to 140 m.p.h. as a high speed, a climb of 1000 ft. the first minute and an absolute ceiling of 20,000 ft.

The Fokker "Super-Universal" hardly needs any description, as its prototype the "Universal" is so well known. Suffice it to say that it is of typical Fokker design with steel tube fuselage and very thick plywood covered wing. The fact that it is fully cantilever and of somewhat larger size distinguishes it from the "Universal" which, it will be remembered, had braced wings.

The Halpin "Flamingo" is of quite new design and deserves considerable attention not only because it is a representative type of this new class of 4700-5000 lb. Wasp engined cabin monoplanes, but also because it is of all metal construction. In general layout it is quite similar to Whirlwind engined monoplanes in that it has wings of uniform section braced by struts extending from the bottom of the fuselage, the front strut also acting as support for the landing gear. Even in dimensions it differs but little, having the span of 48 ft. as against 46 ft. 4 in. for the Bellanca, for instance. Its main points of interest are in detail design and construction. The fuselage, while of welded steel tubing construction, is covered entirely with duralumin. The small clips are



The Wallace "Tourosplane" with wings folded. The engine is an 80 hp. Anzani

welded at intervals to the fuselage tubes, to these are attached light duralumin channels, to which in turn the covering is riveted. The covering is of essentially flat sheet, with widely spaced corrugations or "beads" provided for stiffness. Although only .014 in. thick, it appears to be perfectly rigid. The wing being of braced type, the wing beams are made of uniform section throughout their length. They are of the I beam type, consisting of vertical web 3/32 in. thick with angles riveted on upper and lower edges. The web as well as the angles are of duralumin. The ribs, consisting simply of the flat sheet of metal, are riveted to the spar webs. The covering is applied in sections with the edges flanged, so that edges of two sections clamp the rib between them and all three are riveted together. The construction is very simple and the external inspection discloses a very small number of rivets. The "Flamingo" was finished just before the Show and was flown from Cincinnati to Detroit after only a few minutes' testing. Such a rush probably accounts for the lack of finish which put it at some disadvantage when compared to highly finished Fokker and Hamilton machines as far as impressions of the visitors go.

The Hamilton "Silver Streak" is probably the most interesting and audacious design of the airplanes exhibited in Detroit. To those expecting to see the machine similar to the one flown in Ford Tour of 1927 it came as a big surprise. All metal and practically all duralumin in construction it has cantilever wings of 54 ft. in span and of seemingly moderate thickness. The wings are hinged at the fuselage to be sure, and are supported by a pair of struts on each side, but the attachment of struts is not far from the root. Indeed, the only purpose of these struts is to avoid obstruction of the cabin by the deep beams necessary in a cantilever wing. As it is, the wing beam structure is made to taper to the upper surface of the wing on length from the strut attachment point to the fuselage, and the hinge fittings are

A Stinson-Detroiter monoplane powered with a Wright Whirlwind and fitted with pontoons

located at the very top of the fuselage. The top member of the fuselage frame, therefore, transmits only direct compression or tension and does not have to be of large size. The cabin, therefore, seating from 6 to 8 people including the crew is exceptionally free from obstructions. The landing gear consists of the axle and brace, or radius rod, hinged at the lower longeron of the fuselage at the fittings to which the wing struts are also attached. The weight is taken by Oleo Shock absorbing struts attached to the axle at the wheel in the lower end and extending vertically to the attachment of the front strut to the wing. The whole layout is very neat and, in combination with long tapered wings, gives the plane appearance of unusual fineness.

The wings, as well as the fuselage and tail surfaces, are covered with corrugated "Alclad" which is huffed, giving the machine a quite finished and very attractive appearance.

The six to eight passenger cabin monoplanes with Wasp engines, weighing fully loaded from 4700 to 5000 lb., represent a quite new and distinct development. The first "Super-Universal" was produced less than one year ago, and "Flamingo" and "Silver Streak" were barely finished in time for the Show. While this type is quite new, its future success is assured by previous experience with 200 hp. monoplanes, and by the fact that it is in line with the craving for speed and power manifest in all methods of transportation. It is very gratifying to see that two out of the three machines of this class were built out of metal. The use of light metals in airplane construction makes a very steady and evident progress, and there is little doubt that all large machines, and many small ones, in the future will be built of light metals. There is only one objection, which applies to all three machines of this class at the Show, and this is extreme narrowness of the fuselages. While we neglected this narrowness and crampiness of cabin in a 200 hp. machine selling for $10,000, we can hardly tolerate it in a 400 hp. nae selling for $20,000. Moreover, we fail to see the reason for this narrowness except mere tradition. With the large frontal area of the Wasp engine, the parasite resistance would be reduced, it seems to us, by bulging the sides of the fuselage,

and by making a nearer approach to the shape of a good streamline body.

Another very interesting group of airplanes at the Aircraft Show was formed by the seven two-seater airplanes with 6 to 100 hp. engines and with weight ranging from 1200 to 1500 lb. when fully loaded. Two of these airplanes seem to have been in existence for somewhat more than a year. Five others apparently were produced a short time before the Show. There was little precedent for the airplanes of this type in America, and the presence of six machines of this type at the Show one is liable to classify as a spontaneous growth. Thus being the case, it is difficult to ascertain whether there is any demand for these machines, and what can be expected in the future. It should not be for

Side view of an Alexander Eaglerock (Wright Whirlwind) fitted with pontoons

gotten, however, that a two seater airplane of 80 hp is a very old type. It was the type used by Allied air forces in 1914. During the last three or four years this type was revived abroad with astonishing success. The DeHavilland "Moth" is now used for training by many flying clubs in England and Canada. The Czechoslovakian "Avia" made some notable non-stop flights from Prague to Paris and return, and an Avro "Avian" was recently flown from London to Australia by Hinkler. In America the development of this type was retarded by great success of the 3 seater type, which used OX-5 engines and was sold at a very low average price of about $2500.00. The two seater light airplane depends on the existence of a light air-cooled engine of modern production and therefore cannot be sold at such a low price. The machines at the show were listed at around $3500.00 or about $1000.00 more than three-seater machines with an OX-5. The supply of OX-5 engines, however, shrinks fast, and with new production engines of 120 hp. the price of three-seater machines jumps to almost $6,000. This being the case, there will be a place for the two-seater type and we may look with some confidence on its future development and success.

Being the result of almost spontaneous growth and not having been yet passed through the purifying process of competition, the machines of the two seater class vary widely in their conception and arrangement. The only common feature apparently is that all of them are monoplanes. The size varies from 30 to 34 ft. in span, 20 to 22 ft. in overall length and 120 to 170 sq. ft. in wing area. Five out of seven machines have side by side seats, one has staggered seats, and one is in tandem. Four out of seven machines have open cockpits and three are cabin jobs.

The Central States "Monocoupe" is probably the oldest and best known machine of the light two-seater class. In its general conception it appears to be a reduced size model of the successful monoplanes of the 200 hp. class. A very deep fuselage makes a comfortable cabin with side by side seats. Single controls are used and the passenger's seat is arranged slightly farther back than the pilot's. The wing panels are hinged at the top of the fuselage and are braced by struts

extending from the bottom longeron. Next in chronological order comes the Mohawk "Pinto"—a bold design and a dashing looking machine. It is a full cantilever low wing monoplane with tapered wings. The open cockpit accommodates two staggered seats and single controls. The provision of staggered seats, while allowing a somewhat narrower fuselage than would be possible otherwise, requires a very large cockpit opening, which furthermore is cut very deep on the sides of the fuselage. While this large opening makes for easy entrance into the cockpit, one can doubt the degree of protection it affords to the occupants. At any rate, this is the only feature which mars an otherwise very clean appearance and apparently high aerodynamic fineness of this machine. The E. P. Hurd Monoplane is of low wing braced type with bracing struts extending from the top of the fuselage to about midway between wing root and tip. The wing of conventional wood and fabric construction appears to be fairly thick and is of uniform section. The fuselage is narrow and two open cockpits are arranged in tandem. The machine is equipped with dual control, and indeed appears to be of very practical type for training. The open cockpit tandem arrangement is the type used for training all over the world and while side by side arrangements were repeatedly proposed for this purpose, they did not succeed in obtaining any popularity. The low wing feature is known to facilitate landing because of "ground" or "cushioning" effect of wings. Cantilever wings of uniform section probably have wing tips strong enough to stand a good deal of abuse, and in any case are very easy to repair.

The Simplex "Red Arrows" are side by side monoplanes with wings of uniform section attached at the middle of the fuselage and fully braced with struts attached to the landing gear. The location of the wing in this position obstructs the vision more than the low wing does, and the combination of wing bracing and landing gear produces an impression of excessive amount of parasite resistance. Two models of this make were shown, one with an open cockpit, another with fitting and celluloid windows built up to form a good cabin.

The Taylor "Chummy" is on the upper limit of the airplanes of this class as far as size and weight goes. Its span

The Aero-Craft "Aero Coupe" powered with a 110 hp. Warner "Scarab" engine.

is 34 ft., wing area 170 sq. ft. and it weighs 1500 lb. fully loaded. It is of pure parasol type with wings of uniform thickness well braced by struts extending from the lower longerons of the fuselage. The fuselage is wide enough to accommodate pilot and passenger side by side, and complete dual controls are provided, including two throttle levers so that both instructor and student can use a left hand throttle. The cockpit is entered by side doors extending for the full height on either side of the fuselage. This is made possible by extending some struts in front and in rear of the cockpit to the wing, which at this place acts as upper longeron of the fuselage. The cockpit is very comfortable and the seat and controls seem to be proportioned just right. Although admitting that side by side airplanes have failed so

far to obtain general recognition as training machines, one is nevertheless tempted to give the case another trial when one sits in the cockpit of the Taylor "Chummy". It can be remarked that the parasol type is undoubtedly the most pleasant one for cross-country flights, as one can have unobstructed view of the countryside. In case of a poor landing or forced landing in a bad place followed by turning over, the parasol certainly offers best protection for the occupants.

To complete the review of light two-seater airplanes, we must mention the Jack Stinson cabin monoplane. It would deserve much more than mere mentioning, were it not for the fact that the completed machine was not exhibited and only a skeleton of the fuselage with wings was shown. One can gather that this will be a side by side cabin training machine, following in general lines the type so familiar as 200 hp. machines. The idea of building and using a cabin airplane specifically for training purposes is quite novel, and may be open to some criticism.

The remaining part of the exhibition was composed of the airplanes of highly speculative type as far as their practical utility and future success goes. The availability of light air cooled engines of about 100 hp. and of very light weight was responsible mostly for their existence. Their general tendency was to utilize the light weight of these engines for increase of useful load rather than for increase in performance. This tendency resulted in production of a variety of three and four seater airplanes with such engines as 10 cylinder Anzani, 7 cylinder Siemens or new Warner "Scarab". Some of these airplanes are biplanes, some are monoplanes and all are of the cabin type. Generally they represent little interest, being apparently built with little knowledge of aeronautical engineering, crude workmanship and indifferent finish. As an outstanding exception we can mention the Stinson four seater cabin monoplane with Warner "Scarab" engine, which has all the characteristic features of larger Stinson monoplanes. It may happen that some of the airplanes of this class will gain recognition, but this is rather doubtful. The general tendency of our time is towards higher power and performance. One is rather inclined to think that eventually 200 hp. engines will be used on four seater cabin airplanes and 400 hp. engines will take their place on six seater ones.

In this respect the Cessna monoplane seems to show the movement in the current direction. Very light in weight, and moderate in size, this four-seater monoplane represented one of the most attractive airplanes at the Show. It departs from convention design in that it is full cantilever monoplane with tapered and rather thin wing covered with plywood. The landing gear is attached directly to the lower longerons of the fuselage, and not a single strut is found above the level. The whole machine looks very refined and one can easily believe that it attains a speed as high as 140 m.p.h. The fuselage is of small size and very compact.

It would be an unpardonable omission to close this review without mentioning the representation of seaplanes in the All-American Aircraft Show. Out of 58 airplanes exhibited there were 9 seaplanes, all of quite modern type. Of these six were of twin float type, one was a flying boat and two were amphibian flying boats. In addition there were exhibited individual floats of three different makes, suggesting the possibility of converting many other airplanes into seaplanes if need arises. As a matter of fact, all of the float seaplanes exhibited at the Show were of the convertible type, and the float seaplane invariably was exhibited alongside of a similar machine equipped as a landplane.

It is interesting to note that all the floats and boat hulls were of metal construction. All three manufacturers of the floats used metal for framing as well as for covering, while all three flying boats had metal covering applied to wooden framing.

Side Slips

By ROBERT R. OSBORN

The committee has unanimously awarded this Week's Prize for Increasing Enthusiasm to the advertising manager for the All-American Aircraft Show for his statement,—"The year's biggest event in aircraft history."

• • • •

We hate to have to do any criticizing of the management of the recent flight of the "Bremen", when everyone else has been praising the project, but we must say that this business of preparing so secretly, taking off so suddenly and landing on some unknown dot on the landscape certainly left the newspapers in an awful fix. In rushing to press they had to run pictures ranging all the way from the new British "Calcutta" flying boat to a Waco Ten with "Bremen" lettered thereon. One artist must have been holding up an edition, as his lettering of the name wasn't all on the plane, the final "N" being supported by a tree in the background. Another prominent newspaper must have sold its stock of airplane pictures short, as it was reduced to printing a picture of the ocean as it exists near Labrador.

Seems as if the Society for the Aeronautical Education of Artists, of which we are still founder, president, and sole member, might have to have another indignation meeting.

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At the time of this writing the reports from Greenely Island state that the fliers are staying with the light-house keeper but all are complaining of the cold. This makes it appear that the light-house keeper hasn't read the chapter, yet, which deals with the etiquette of presenting pajamas to trans-Atlantic fliers.

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The fact that the Junkers monoplane was so badly damaged in landing brings home to us the point that trans-Atlantic flying can never be practical until Greenely Island has more and better landing fields. Suggestions for the editorial staff, —"The Crying Need for Landing Fields on Greenely Island." "Inactive Greenely Island Chamber of Commerce Delays Trans-Atlantic Service."

• • • •

We think the prize news item among the great number that described the flight of the "Bremen" was the one in the New York morning newspaper which explained what was meant by an "intermediate landing" at Greenely Island. An intermediate landing, it seems, is one which differs from a three-point landing in that the wheels touch before the tail skid does.

• • • •

Another New York morning newspaper was a close second with its description of how the instrument board lights went out leaving the plane absolutely dark,—"The motor droned on, hissing as the cold sleet struck the heated surfaces, but never missing a beat. This continued for four hours while Baron Von Huenefeld worked like a madman to repair the lighting system. Suddenly it winked on, the three gazed feverishly at the instrument board and saw that they were 400 miles off their course."

That Miles Off-Your-Course-Indicator should be on every instrument board, we'd say.

• • • •

One paper ran a two-inch screamer headline across its front page "Baron Was Ready To Kill His Crew". We didn't know that was news. We've often had that urge ourself, but so far have always compromised on merely telling them what we thought of them.

FOREIGN NEWS

By Special Arrangement with the Transportation Division Bureau of Foreign and Domestic Commerce

Fairchild Airport in Canada Always Open

Fairchild Aviation Limited of Grand 'Mere, Quebec, Canadian subsidiary of the Fairchild Aviation Corp of America, reports that its airport situated on Lac a la Tortue, two and one-half miles east of the city, is always open to visitors.

A marine railway is available for beaching both seaplanes and boats, and mooring buoys, fuel, light repairs, etc., may also be had. Surrounding fields are not suitable for land planes, the company reports, but lake and fields are good landing tracts in winter for planes equipped with skis. For parties arriving from the United States, a customs house is located in Grand 'Mere.

Fairchild Aviation Limited's Lac a la Tortue seaplane base near Grand 'Mere, Quebec. Byrd's polar Bellanca plane was recently ski-tested on this frozen lake, the edge of which is visible in the foreground.

Germany and Spain in Aero Agreement

Diplomatic permission must now be obtained before Spanish or German privately owned planes may pass over each other's territory, according to an aeronautical agreement recently signed by those countries. The ruling holds regardless of whether the airplanes make a landing, it is stated.

Airplanes, the agreement stipulates, must display plainly visible and distinctive marks of nationality and registration while in flight and must in addition bear the name and domicile of the owner. The certificates of registration, navigability, and other documents required in the home territory must be carried by the pilots.

Railings of this type are increasing in number as the use of the airplane becomes more common. Because of the proximity of the various countries, it is necessary to make various international agreements regulating the use of the air.

Luft Hansa to Run Locals and Expresses

Local and express service is to be offered by the Luft Hansa in place of the single type now scheduled, according to recent statements by that company. Traffic this year will be speeded by the new arrangement, for the express planes will omit various intermediate stops on the network of airways. Paris or London, for example, will be reached from Berlin with only one halt instead of the usual three or four.

More night flying will also be offered on the new schedules. Service to Hanover is to begin shortly, and according to plans a night plane will soon fly between the German Capital and London, while another plane will leave Tempelhof Field, Berlin, at 11 P.M. to arrive in Moscow the next afternoon at 3 P.M.

Tempelhof Field to Have Taxiing Track

To take care of increased spring and summer traffic, a number of improvements are being made at Tempelhof Field, Berlin, according to a recent announcement. Among the new features will be a concrete track, half of which will soon be completed, running around the nature landing field to facilitate movement of planes to hangars after they have landed.

Officials of the Luft Hansa, which operates the airport, state that an increase of 50 per cent. in traffic is expected this year. The International Air Traffic Exposition, to be held in Berlin October 8-28, will add to the activity.

An average of 36 planes a day took off or landed at the field last year. The number is expected to reach 60 this season.

Australian Company Reports on Service

Australian Aerial Services, Ltd., recently made public the following report covering operations of the company through February.

Total mileage as at Feb. 29, 1928	551,730
Total miles flown during February	18,223
Ten plane mileage for February	6,578
Percentage of arrivals on scheduled time	62.5%
Percentage of arrivals not more than 30 min. late	70%
Schedule flights completed since Nov. 11, 1924	100%
Number of fatal accidents since beginning of service in 1924	Nil
Average speed including intermediate stops	66 m.p.h.

Italian Line Extends Service

The Italian Air Service, Inc., which maintains the air branch of the Cosulich Steamship Line's international travel services, has entered an agreement whereby planes will carry passengers from Trieste to Vienna and Budapest. Planes will take off at Zara, on the east coast of the Adriatic Sea, and make stops at Lussinpiccolo, Portorose, Trieste, Venice, Milan, and Turin. Seaplanes are used on this line, but land planes will be operated in the new Trieste-Vienna-Budapest service.

Portugal-Azores Service Planned

Fortnightly service between Lisbon and Funchal and three ports in the Azores—Ponta Delgada, Angra, and Horta—is to begin as soon as the weather becomes favorable, it has been reported. Junkers seaplanes will be used by the corporation forming the line. Two Germans who have become naturalized Portuguese citizens are the incorporators.

New Canadian Company Chartered

A Canadian federal charter has been granted to the Capital Aircraft Service, Ltd., according to a notice contained in the *Canada Gazette*. The firm, whose capital is listed at $50,000, will manufacture and repair airplanes and accessories. Headquarters of the company will be located in Ottawa.

Russia Fights Pests from Air

Russia is now fighting pests which periodically threaten the great grain raising plains of the land with chemicals sprayed from airplanes. The Soviet reports that during 1927 nearly 77,000 acres of agricultural lands were sprayed. This was a great increase over 1925 when only 2,700 acres were so treated.

Danish Army to Add 12 Fokkers

The Danish Army, it has been announced, will add 12 new Fokker pursuit planes to its force in the near future. Statement as to the type of power plant, other than the fact that the engines will develop 220 hp., has not been made.

AIRPORTS AND AIRWAYS

Springfield, Mass.

By Charles Hanson Gale

Capt. Eddie V. Rickenbacker flew here from Hartford recently to address a meeting of automobile executives on aviation. He came up in a Fairchild plane piloted by Kitty Barrows of the New England Aircraft Co. of Hartford, agent for the Fairchild cabin plane. The party landed at Randall Field, Agawam.

The famous war ace urged the immediate development of aviation facilities in this city which are largely lacking at the present time and his speech as reported in the newspapers made considerable impression on the city.

The enlarged Barnes Airport at Westfield will be dedicated May 25, 26, 27 by an air pageant to which a large number of well-known pilots are being invited. Preliminary preparations indicate that the affair will be one of the greatest aerial displays ever held in Western Massachusetts. The new brick and steel hangar which includes shops and offices will be dedicated at the same time. The field has been in existence for about six years and the rebuilding was started last fall.

Commander Charles E. Rosendahl of the Los Angeles addressed an asthasnastia meeting of the Exchange Club recently on some aspects of airship navigation, the destruction of the Shenandoah, and the recent flight to Panama.

Local Fields Busy

All the local flying fields are busy flying or getting ready to fly. Harry Herman opened the flying season at Dunn Field, Longmeadow, by flying down there in his American Eagle from Fisk Park where he assembled the plane. He assembled a Swallow there at the same time but has not taken it out yet. Fisk Park is preparing the field for flying purposes and it is expected to be ready soon.

Fred Boots, chief pilot for the Massachusetts Airways, has been flying out of Randall Field regularly. He recently tested an Eaglerock assembled by Lieut. Elzor Hall of the Springfield Ground School and delivered it to the Rollins Company of North Easton, the company's agent in Bristol County.

Ashbel H. Hoyt of Ware was recently elected a pioneer member of the Aerial League of America. His interest in aviation is said to date back to the early days.

A new wooden hangar has been built at Randall Field by Massachusetts Airways. The hangar is being used for the assembly of planes and will later be reserved as far as possible for visiting planes.

A group of men headed by Joseph Fulk who have been attending the ground school of the Springfield Airport Corp. this winter are forming a flying club, it was recently announced. The purchase of a plane is included in their program.

Philadelphia, Penna.

A new administration building and machine shop will be constructed in the near future at the Philadelphia Airport for the 28th Division Air Service, Pennsylvania National Guard, according to a recent announcement by Maj. J. Sydney Owens, commander. Twenty thousand dollars has been appropriated toward initial construction work by the State Armory Board at Harrisburg, of which Gen. William G. Price, commander of the Pennsylvania National Guard, is chairman. The exact cost of the new buildings is uncertain at this time, but they are expected to involve an outlay of more than $100,000.

Archer Saki of Lakewood, N. J., president and operator of the Archer Flying Service of Lakehurst, was a visitor at the Philadelphia Airport recently, revealing during his stay here that he is selling his hangar, shop, and other equipment at Lakehurst and that he will start operations at a flying field site to be selected along one of the highways near Atlantic City. A 75 ft. by 100 ft. field hangar is to be erected on the new site, Mr. Saki said. He owns two Waco planes—a 9 and a 10.

A Whirlwind Travel Air—a special plane—is being stored at the Philadelphia Airport in one of the hangars of the Lodington Philadelphia Flying Service by Fred Stone, the musical comedy star. Stone purchased the plane during his recent trip through the West and flew here with a pilot. Last summer he took a flying course at the Philadelphia Airport and, with his daughter, Dorothy Stone, was a frequent and interested visitor at the airport. Stone recently flew the plane to Washington to fill an engagement and, still more recently, flew it to Atlantic City when his new show opened at the shore.

The United Flying Club's new Lincoln-Page (OX-5) was flown to the Philadelphia Airport recently from Lincoln, Neb.

Inspect New York-Atlanta Route

An inspection trip, for various purposes, over the route of the New York to Atlanta air mail service, was completed recently by Geoffrey S. Childs, general manager and vice president of Pitcairn Aviation, Inc.; James G. Ray, manager of operations; R. W. T. Ricker, a consultant on the development of air mail traffic, and Harold Holbrook, Director of Public Information. The party visited the Pitcairn operations at Candler Field, Atlanta, Ga.; Spartanburg, S. C.; Greensboro, N. C., and Richmond, Va.

Ground markers for the aid of pilots will be erected at Paoli, Malvern, and Berwyn, at the upper end of the Main Line of the Pennsylvania Railroad, by Dalton-Wanzel Post No. 640, American Legion of Paoli. The Post took action upon the request of F. Trubee Davison, Assistant Secretary of War for Aviation, who asked recently that the American Legion take an active part in the movement to erect 10,000 aviation markers throughout the country in 30 days. A committee representing the Post will confer soon with members of the State Aeronautics Commission here.

McKeesport, Penna.

Success of the aeronautical exhibit held recently here under the auspices of the local N.A.A. chapter have led the group to plan for such an exposition annually.

About twenty exhibitors of parts and various materials used in the manufacture of airplanes were present at the recent show. Aerial photography and model airplane displays were also included. The three boys who won in the model airplane contests were given trips to Cleveland, O., in one of the Ryan monoplanes used on the mail line. All their expenses were paid.

St. Louis, Mo.

By M. L. Alexander

Col. Charles A. Lindbergh's famous monoplane the "Spirit of St. Louis" now on public exhibition at Lambert-St. Louis Field, is to be turned over to the Smithsonian Institution at Washington within two or three weeks, it is understood, so St. Louisans have only a short time left in which to view the historic plane on its home field.

Before Lindbergh turns the plane over to the Smithsonian, it is understood that he will take each of the financial backers of his trans-Atlantic flight for a hop around the field so that all may be said that the backers were the last to be carried in the plane. That, it is said, is the method Colonel Lindbergh has taken of signalizing his gratitude to this group of St. Louisans.

Parks Airport, the new flying field just south of East St. Louis is to have its first flying provided weather is favorable.

Lighthouse of the Air

"S-D", the giant 10,000,000 candlepower airway beacon erected by the Standard Oil Co. of California on Mt. Diablo near San Francisco Bay—sister beacon of "S-L" standing on the Merced Hills adjacent to Los Angeles. The 70 ft letters, lighted with neon gas tubes, designate the Standard-Diablo and Standard-Los Angeles towers.

O. L. Parks, president of Parks Airlines, which operates the field, announced that he would have at least one Travel Air at the field and possibly two.

The formal opening of the field was tentatively set for April 28. Colonel Lindbergh has accepted an invitation to be present, Parks says, and the date will be reset only in the event Lindbergh cannot be present at the time fixed. Dirigibles from Scott Field and pursuit planes from Selfridge Field are also scheduled to be on hand to entertain visitors.

Another new field, within reach of St. Louis, is being prepared at St. Albans, Mo., on the Missouri River in Franklin County, by Oscar Johnson who recently bought a Whirlwind Travel Air and engaged "Boots" Dempsey to fly it for him. The field, a 60 acre tract, is on the bank of the Missouri and is part of the country estate of Johnson's mother.

O. E. Scott a Veteran Manager

O. E. Scott, manager of Lambert-St. Louis Field since it was converted from a cow pasture to an airdrome, has been retained by the city to fill the same job under municipal control. Scott is pilot for Harold M. Bixby, chairman of the board of the Chamber of Commerce, and owner of the first Travel Air ever manufactured. He is shortly to turn in his old plane, an OX-5 job, for a Whirlwind Travel Air.

Frank T. Dunn, pilot for Phil Ball, owner of the Browns, flew Ball's Ryan Broughaee to Tulsa with Walter Fritsch, vice president of the club as his passenger. Fritsch looked in on the Browns, who were in Tulsa at the time.

Dunn plowed through heavy weather for the southward trip, which took 5 hr. 45 min. against a heavy headwind. Coming back with a tailwind Dunn flew from Tulsa to St. Louis in 3 hr. 10 min.

Tex LaGrohe visited the field recently with a Siemens-Halske Waco. It is the first time a plane with the German engine, now made in America, had visited the field and LaGrohe allowed several of the field pilots to fly it.

Kansas City, Mo.
By H. H. James

The "Airplane Bishop" is to visit Kansas City in May. He is Bishop John L. Neulsen of the Methodist Episcopal Church, and is now located at Zurich, Switzerland. He is coming here to attend the general conference of his church which opens May 1.

Bishop Nuelsen has become known throughout Europe as "the Airplane Bishop" because of his frequent use of planes in his work. By using a plane he frequently preaches in three countries in a day. He will hold a morning service in Zurich, take a plane and fly to Moscow, Russia, for a night service, stopping at some point in Germany for an afternoon service.

The Bennett Flying School of Kansas City has opened night classes for persons employed in the daytime and who desire to learn to fly. The night classes provide thorough training in the ground work of aviation and includes instructions in engine work, fuselage welding, covering and building wings, rebuilding planes, etc.

Classes Six Nights a Week

The night classes are conducted at 217 W. 12th St., where the class room has been equipped with OX-5 engines and Swallow and Eaglerock fuselages. The location is central and easily reached from all parts of the city. The classes are conducted six nights each week, from 7 to 10 o'clock.

When the students are ready for actual flying they are then transferred to the school's flying ground at Richard's Field. When the course is completed the government examination for a commercial pilot's license can be taken at the field without cost, a United States officer giving the examination.

To create a wider interest in aviation, the N.-Sun Lines, operating buses and airplanes out of Kansas City, has established a free bus service from the downtown sections on Sunday to the company's flying field at Richard's Field.

Washington, D. C.

W. R. Gregg, chief of the aerological section of the Weather Bureau of the United States Department of Agriculture, has recommended the construction of a new upper-air station at Greensboro, N. C., to serve as a meteorological station along the New York to Atlanta air mail route.

The Bureau's well-equipped meteorological stations at Hadley Field, northern terminus of the route, and at Washington, will be used in the new service.

These announcements came as a result of arrangements that have been made between the Weather Bureau and Pitcairn Aviation, Inc., of Philadelphia, for a complete weather reporting and forecasting service in connection with the new air mail route which will be inaugurated May 1.

The Bureau has arranged with the Pitcairn company to appoint field managers of the company as airway observers. The observers do not make forecasts of the weather, but simply observe conditions as they are and give reports to adjoining stops on the line just before the pilot takes off, so that he may be informed of conditions ahead.

This appointment carries no compensation but enables these men, through their official status, to call for reports from airway stations and exchange them with adjacent airports, and to certify the telephone and telegraph accounts as correct. The report covers temperature, barometer readings, visibility, ceiling, and storms.

The airway observer stations will be located at each stop along the route and at many emergency fields between the main stations, which are operated by experienced meteorologists.

This arrangement is temporary, for it is expected that during the summer the trained Weather Bureau personnel will take over the work at Washington, Greensboro, and Atlanta airports.

Chicago, Ill.
By H. H. Slawson

An air tour of Illinois with some 20 or more planes in the parade, is planned for June by the aeronautical committee of the Illinois Chamber of Commerce. Its aim is to encourage airport construction and stimulate interest in aviation.

A substantial increase is noted in the quantity of air mail carried over the routes leading to and from Chicago during March. On the Chicago-New York and the Chicago-Kansas City-Dallas lines, the month's total was 59,564 lb. as against 48,187 for February.

Bids for the air mail contract on the Chicago-Atlanta air mail line will be opened in Chicago April 30, it is announced.

Express service by airplane between Chicago, Springfield, and Peoria, Ill., and St. Louis, Mo., is now being supplied by the Robertson Aircraft Co. cooperating with the American Express.

A remarkable aeronautical demonstration was supplied recently in the flight of 100 Milwaukee business men to Chicago to attend a meeting of the Chicago Association of Sales Managers. Some 30 planes brought the Badger City salesmen down for supper. The party included Gov. Zimmerman of Wisconsin and Bert Acosta.

Illinois has 58 good air fields, according to the figures issued by the aeronautical branch of the Department of Commerce.

An All-Chicago model airplane tournament is being promoted by the *Chicago Tribune*. Indications point to a record entry. Competition is divided into two classes. Boys

under 16 years of age are eligible for Class B events. Those between 16 and 21 enter Class A, the senior division. There will be an outdoor commercial duration competition on May 19 at Soldier Field. Then on May 26 an outdoor duration contest for all models will be staged in Washington Park. Lastly, on May 27, the indoor events will be held in a national guard armory.

Spokane, Wash.

By E. Harve Partridge

One new Douglas O2 plane, and possibly two, will be received soon by the national guard unit, Lieut. C V Haynes, regular Army instructor, has been informed. The unit now has Lieutenant Haynes' DH, two Douglas O2's, and two Consolidated PT's.

Request from the Virgin Islands as to best methods of acquiring an airport and developing it has been received by the Spokane Chamber of Commerce. The Chamber sent data.

Actual bombing practice and machine gun work, the first the 41st Squadron has done, will be undertaken soon, Maj John T. Fancher has announced. Heretofore practice work has been limited to individual and formation flying and ground work.

The Buhl Whirlwind plane in which Pilot Nick B Mamer of Spokane won third place in the Class A New York Spokane air derby in 1927 has been sold by the Mamer Flying Service to Samuel J Wilson, president of the Northwest Mines Investment Co It has been christened the 'Golconda". Ownership of many mines in Washington, British Columbia, and Mexico made it necessary for some quick means of travel from property to property, and Mr Wilson decided the airplane furnished the only means possible of getting first hand and accurate data from the mines.

Pilot Mamer has made the first trips with Mr Wilson as passenger but the mine head will employ some Spokane flier for full time duty. A trip to Mexico is contemplated in the near future

Atlantic City, N. J.

Bader Field, Atlantic City's Municipal Airport, is being used as the Atlantic City terminus of the new taxi airplane service between Atlantic City and Camden that is being operated by the Crescent Air Service, Inc.

A temporary canvas hangar has been erected at the airport pending the building of a steel hangar capable of accommodating five or six planes. "The hangars," Reuben A Fowler, secretary-treasurer of the Crescent company, explained, "will be used until Atlantic City moves its temporary convention hall to Bader Field and uses it as a hangar. The canvas hangar can house two planes"

Mr Fowler inaugurated the service recently when he flew to the shore in a three place Challenger plane. The plane was piloted by George C Hand, the company's chief pilot, and it took off from the Crescent Airport. A regular schedule and rates are to be announced within a few weeks.

Four three place Challenger planes will be operated on the shore route during the summer months. Five of these were recently delivered at the factory at Hagerstown, Md. All were flown to Camden by Chief Pilot Hand. Until a regular schedule is announced, the company will make flights between Camden and Atlantic City at the convenience of patrons.

The company has established headquarters at Bader Field and Mr Fowler will be in charge of operations at the terminus until organization plans at Atlantic City are completed. Frederick A. Riedel, president of the company, will continue in charge of operations at the Camden terminus at the Crescent Airport.

Among the recent visitors who flew to Bader Field were Mayor Anthony M. Ruffu, Jr., Harry H. Kreehmer, president of the Atlantic City Aero Club, and Mr. and Mrs. Lowell Harding, all of whom came here from Philadelphia in a Fairchild cabin monoplane owned by the Potomac Air Service, Inc., of Washington, D. C., and Gettysburg, Pa., and flown by Mr. Harding. The plane also visited the Crescent Airport in Camden during its flights in this section of the state.

New Brunswick, N. J.

The Aero Club of New Brunswick recently heard J. D. Peace of the Pioneer Instrument Co. of Brooklyn, N. Y., speak on 'The Earth Inductor Compass and Blind Flying". The talk was illustrated with lantern slides of various instruments used in modern planes.

Leslie Cramer and John Fuchs, both of the local club, recently had the pleasure of a flight to Cleveland over the air mail route. They were favorably impressed by the Cleveland Municipal Field. Since the trip, both men have realized more fully the value of air mail lines; and John M. Miller of the club now comes forward with the suggestion that air mail contractors should carry more of the country's business men—a top notch advertising idea.

John G Whytlaw, Jr, of New York City was the first to solo this year at the New Brunswick Airport.

Detroit, Mich.

By John T. Nevill

Eddie Stinson and George Haldeman, holders of the world's airplane endurance record, were honored guests recently at a dinner in the Presbyterian Church dining room at Northville, Mich, where the Stinson airplane factory is located.

The affair was sponsored by the Northville Exchange Club, aided by the Rotary club and the business men of the village. Among the guests present were Mrs. Stinson, who visited her husband's record flight in Florida, and engineers and mechanics of the factory. William Mara of the Stinson Aircraft Corp was toastmaster.

Mrs. Evangeline L. L Landbergh, accompanied by Miss Maud Dawson, a fellow teacher at the Cass Technical High School, recently flew to Toronto, Ont., to attend the annual convention of the Ontario Educational Association. Mrs. Lindbergh was made a life member of the organization.

The flight was made in a five passenger Buhl cabin plane piloted by Louis G. Meister, sales manager of the Buhl Aircraft Co of Marysville, Mich.

George Shore, piloting a tri-engined Ford airplane, broke the record for the Detroit-Buffalo Ford air route recently when he flew from this city to Buffalo in 1 hr 35 min.

Leaving Detroit at 8:45 A M., Shore landed his plane, carrying 1,300 lb of freight, on the Buffalo field at 10:20 A.M. Officials at Ford Airport said that an attempt was made to better the record.

John J Peace, field engineer of the Pioneer Instrument Co., recently addressed the Detroit Flying Club at the Book-Cadillac on the operation of navigation instruments. A feature of the program was a slow motion picture showing the operation of a Handley Page wing slot, the flow of air over a wing curve, and the travel of a bullet fired from a high powered rifle. Peace said the film required 20,000 exposures a second.

Orlando, Fla.

By R. T. Bly

Both east west and north-south runways of the new municipal airport here have been cleared and graded. Construction of another through street to the center of the city is also being rushed at this time to provide better transportation to the field.

Two students enlsed recently at Buck Field under the direction of the Orlando Airlines School. One of these students was L. W. Stacy, student mechanic who it is expected will

remain in charge of the field, machine shop, hangar, etc. when E. C. Nilson, president of the Orlando company, takes over the supervision of the new municipal airport.

An airport beacon with visibility of 20 mi. has been installed on top of the 10 story State Bank Bldg. in the city's center. It is automatically turned on at dusk and off at dawn. A constant white beam is thrown from the beacon which rotates once each minute.

The other light in this vicinity is a nine second light at Benson Springs. Airport beacons are also in operation at Jacksonville, Tampa, Orlando, Lakeland, and Miami.

Portland, Ore.

By John W. Anderson

Verne C. Gorst, former president of the Pacific Air Transport Co. and now operator of a flying school in Seattle, and Walter T. Varney, president of the Varney Air Lines, air mail contractor on the Pasco, Wash.-Salt Lake City line, are sponsoring further experiments with monster parachutes to lower disabled planes. Gorst has at his Portland home the parachute used by R. Carl Ohlze, the pilot in a 2500 ft. drop in California. Experimental landings will probably be made here when the device is considered perfected.

W. O. Snyder, Washington, D. C., of the airport division, Department of Commerce, paid an unofficial visit to the Port of Portland Airport recently. He discussed methods of financing and other airport problems with J. H. Polhemus, general manager of the port, and C. O. Lovaas, superintendent of the airport.

Salt Lake City, Utah

By Robert Blackstone

President Frack of the National Parks Airways, Inc., the new air mail line from Salt Lake City to Great Falls, Mont., has announced that survey work for intermediate fields and improvements on the airports of the regular stops is progressing rapidly and cooperation is evidenced on all sides.

This new airline will use four Super-Universal Fokkers, powered with 420 hp. Wasp engines. These monoplanes are six passenger cabin planes which will not require special flying clothes for air travellers.

Mr. Frank said that the company has promised to deliver the first Fokker May 15, and one every two weeks until they have the fleet. Service is scheduled to begin June 1.

Ardmore, Okla.

The Oakley Airport here is making many plans for future development and for future work in making Ardmore the air minded center of Southern Oklahoma. A new Travel Air three passenger biplane has been purchased to use in work at the field. This is the first step in the plans for expansion.

Modern equipment will soon be had at the local airport. The hangar is to be developed into a first class service and repair shop for visiting planes. Southern Oklahoma has long been in need of such a place as this for there are no large repair shops there. Ardmore offers an ideal location for such a shop.

Ames, Ia.

The Gerbracht Aeronautic Corp. has leased a 40 acre field two miles south of Ames on the Jefferson Highway, that has been leveled and is being sodded with blue grass to be in good condition for the fliers. This site is marked with the customary circle, it has three unobstructed runways, there is the usual wind cone on the hangar, and a new Butler T shaped individual hangar is being erected for the storage of some local plane.

The Gerbracht Aeronautic Corp. is the Travel Air distributer for Iowa and is progressing with a good business in passenger hopping, cross-country flights, and student instruction. One of the recently sold Travel Airs was an OX-5 plane delivered to Lee Merritt, a student at the Iowa State College in this city, who recently soloed. H. W. Sommers is receiving flying instructions at present from Wilfurd Gerbracht and will receive a new Travel Air soon, which will also be used by the Cooper Flying School of Des Moines in air taxi service and the instructing of students.

Herman Panning, the local colored flier, is having his Humming Bird rebuilt at the White Aircraft Co. at Des Moines and will have it ready for service within the near future.

Norton, formerly of Boone, Ia., but at present conducting a flying school at Independence, Kan., stopped over at the field operated by the Gerbracht Aeronautic Corp. in his Swallow to pay his old friends a visit.

Miles City, Mont.

By J. V. Pachard

The new Miles City Municipal Airport will be 5280 ft. by 7920 ft. An additional 80 acres to the west of the present field is being purchased, and work on improvements will begin immediately. The airport is located on perfectly flat table land with no obstructions of any kind near the field.

Modern hangars, complete facilities for the servicing of planes, and other improvements will be made. Many letters of commendation have been received by pilots who used the field during the New York-Spokane race of last year in regard to the airport, which is one of the finest natural landing fields in the country.

Jay Gehan landed at the airport recently en route to Havre, Mont. from Sioux City, Ia., with a group of four stockmen bound for the convention of the Montana Stock Growers Association. He is flying a Ryan Brougham for the Stransky Airlines at Pahwaska, S. D.

Kellogg, Idaho

By Ralph Lafferty

In response to the invitation of the Shoshone Flying Club, about one hundred men recently appeared on the site for the new aviation field here and cleared the grounds of stumps and debris. Four tractors, nine trucks, and two graders were furnished by the county and city of Kellogg. A field was cleared 2000 ft. in length and 400 ft. wide. After a little more work the airport will be one of the best in the state and about the only one between Missoula, Mont., and Spokane Wash. The field will be used frequently by fliers from Montana, Idaho, and Washington.

After the field is in shape the Kellogg Flying Club with Kermit Paul as their aviator, will start training students to fly. They have purchased a new Waco 10 for the purpose.

Cincinnati, O.

Each Tuesday night over the radio, two members of the Embry Riddle Co. here conduct an aviation forum, answering the questions that are mailed to the studio and field. Usually, John Paul Riddle and Charles E. Planck conduct this "aviation conversation." The questions sent in concern flying schools principally, according to Riddle, but technical questions as well are asked. Many of these are answered by letter.

The interest of Powel W. Crosley, head of the radio corporation, in aviation, enables the operating company to give these programs. It is believed that they are rapidly piling up a wide interest in aviation in the neighborhood served by WLW.

Electra, Tex.

By T. J. Stansel

C. L. Sl[illegible] of this city recently returned from the factory with a new Waco 10 plane and is now demonstrating it here. Still stat[illegible] that he has lined up a number of prospective Waco purchasers.

UNITED STATES AIR FORCES

Number of Air Corps Planes Low

Recent inventory of Air Corps equipment revealed that a total of only 889 serviceable planes were on hand—the lowest mark reached by the Air Corps since military planes were placed in mass production during the World War. Air Corps officials feel certain, however, that this number will remain as the low mark, since a steady influx of new planes is beginning.

With three new planes in, the total has risen to 902. The inventory shows these as follows: nine attack, 80 bombardment, 410 observation (including 26 equipped for photographic purposes), 171 pursuit, 194 training, 26 cargo, and 12 miscellaneous types. With the exception of 251 observation planes of the DH type, the 12 miscellaneous, and 60 bombardment planes, the remainder are of comparatively recent design and construction. The DH's and the miscellaneous types are the only planes on hand which were constructed during the war. All but 17 of the DH's have been remodeled and considerably strengthened by the substitution of metal fuselages for the conventional wooden ones.

As the result of contracts for new equipment, a total of 386 new planes of various types are due to be received. Incidently, it should be stated that 54 experimental planes now on hand are not included in the total of 902.

Experts Designing New Navy Airship

A committee composed of five of the world's foremost experts on the planning and building of lighter-than-air craft will shortly submit to the Navy plans for the building of an aircraft two and one-half times larger than the dirigible "Los Angeles." A bid for the construction of this ship will be submitted by the American Brown Boveri Electric Co of New York, it is stated.

The committee for the New York electrical firm is composed of Prof William Hovgaard, in charge of aeronautics at Massachusetts Institute of Technology, chairman, Capt. Anton Heinen, formerly with the Zeppelin company in Germany, Prof. Herbert C Sadler of the naval architectural and aeronautical department of the University of Michigan, W Watters Pagon of Baltimore, and Ernest R. Riggs, chief engineer of the New York Ship Building Co.

The new ship, according to preliminary plans, will be a craft of 6,500,000 cu ft. It will have features of both German and English air-ships but will be fully American in construction.

Prepare for Love Field Summer Training

Negotiations for the 1928 summer training camp of the 8th Corps Area of the U S Air Reserve at Love Field, Dallas, Tex., have been completed by Lieut. Harry Weddington, officer in charge of the 366th Observation Squadron and Lieut. Harry B Barnhart, adjutant of the squadron. The summer training camp will be open continuously during July and August at Love Field.

The camp will be attended by reserve officers from Texas, Oklahoma, New Mexico, and Colorado, with 14 days of training given to classes of 35 men. Training will be under the supervision of Lieutenant Weddington, the equipment to be used being seven training planes and one Douglas O-2 service plane.

Rickenbacker Bill Goes to Committee

A bill recently introduced in the House of Representatives asking award of the Congressional Medal of Honor for Capt. Eddie Rickenbacker, leading American war ace, has been referred to the Committee on Military Affairs.

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Missouri

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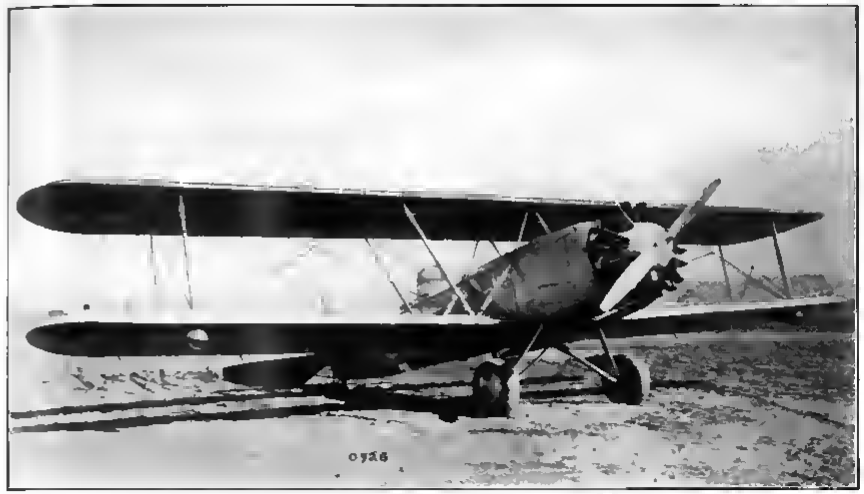

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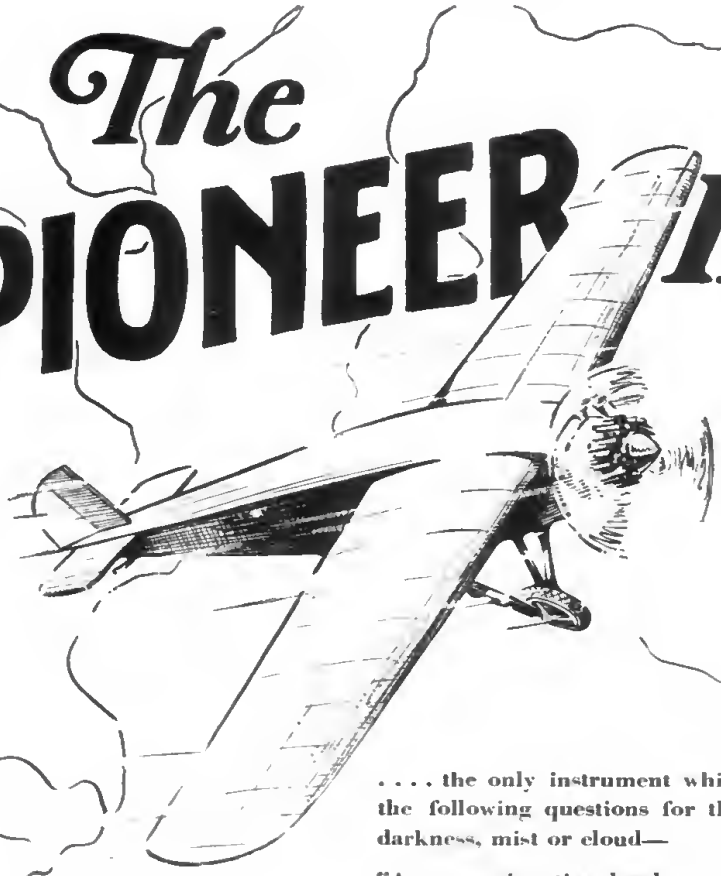

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